SAMUEL ADLER

THE STUDY OF ORCHESTRATION

SECOND EDITION



The Study of Orchestration

Second Edition

BY THE SAME AUTHOR

Sight Singing

The Study of Orchestration

Second Edition

Samuel Adler

Eastman School of Music
of the University of Rochester

W. W. Norton and Company
New York · London

Acknowledgments

Since this page cannot legibly accomodate all the copyright notices, pages 631–32 constitute an extension of this copyright page.

Belmont Music Publishers
Schoenberg, *Brahams: Piano Quartet in g minor, Theme and Variations*, Op. 43a & 43b © 1944, 1949 Belmont Music Publishers; Used by permission—pp. 550–57
Schoenberg, *Erwartung* © 1916 by Universal Ed. A.G. Vienna; Used by permission of Belmont Music Publishers, Los Angeles, California 90049—p. 323

Belwin Mills Publishing Corp.
Gould, *Interplay* © 1960. Used by permission of Belwin Mills Publishing Corp.—p. 365

Belwin Mills Publishing Corp.
Crumb, *Echoes of Time and the River* © 1968 Mills Music, Inc., a division of Filmtrax Copyright Holdings, Inc. International Copyright Secured. Made in U.S.A. All Rights Reserved—pp. 104, 429
Gould, *Interplay* © 1961 Mills Music, Inc., a division of Filmtrax Copyright Holdings, Inc. International Copyright Secured. Made in U.S.A. All Rights Reserved—p. 365

Boosey and Hawkes Inc.
Bartók, *Concerto for Orchestra* © Copyright 1946 by Hawkes and Son (London) Ltd.; Copyright renewed—pp. 25, 41, 71, 165, 183, 185, 213, 317, 358–60
Bartók, *Concerto for Piano, No. 3* © Copyright 1947 by Boosey and Hawkes Music Publishers Ltd.; Copyright renewed. Reprinted by permission of Boosey & Hawkes, Inc.—pp. 583–85
Bartók, *Concerto for Violin* © Copyright 1946 by Hawkes and Son (London) Ltd.; Copyright renewed—pp. 99, 318
Bartók, *Divertimento* © Copyright 1940 by Hawkes and Son (London) Ltd.; Copyright renewed—p. 67
Bartók, *Mikrokosmos (Volumes 1–6)* © Copyright 1940 by Hawkes and Son (London) Ltd.; Copyright renewed—p. 514
Bartók, *Music for Strings, Percussion and Celesta* © Copyright 1937 by Universal Edition· Copyright renewed; Copyright and renewal assigned to Boosey and Hawkes, Inc. for U.S.A.—pp. 132–34
Bartók, *String Quartet Number 4* © Copyright 1929 by Universal Edition; Copyright renewed; Copyright assigned to Boosey and Hawkes, Inc. for U.S.A.—pp. 17–18, 40
Bartók, *String Quartet Number 5* © Copyright 1936 by Universal Edition; Copyright renewed; Copyright and renewal assigned to Boosey and Hawkes, Inc.—p. 40
Britten, *Four Sea Interludes* © Copyright 1945 by Boosey and Hawkes Ltd.; Copyright renewed—pp. 101, 307
Britten, *Serenade for Tenor, Horn and Strings* © Copyright 1944 by Hawkes and Sons (London) Ltd.; Copyright renewed—p. 269
Britten, *Young Person's Guide to the Orchestra* © Copyright 1946 by Hawkes and Son (London) Ltd.; Copyright renewed—pp. 256–57

Printed in the United States of America.

This book was composed in Melior by Vail-Ballou.
Book design by F. Fodet.

Library of Congress Cataloging-in-Publication Data

Adler, Samuel, 1928–
The study of orchestration.

Bibliography: p.
Includes idex.
1. Instrumentation and orchestration. I. Title.
MT70.A3 1989 785'.028'4 88-29677

ISBN 0-393-95807-8

W. W. Norton & Company, Inc., 500 Fifth Avenue, New York, N.Y. 10110
W. W. Norton & Company Ltd., 10 Coptic Street, London WC1A 1PU

6 7 8 9 0

Contents

Preface to the Second Edition

One of my favorite Biblical quotations is: "Thou renewest daily the work of creation." According to this optimistic message to humanity, each day represents a new opportunity, a second chance. I feel as if I have been given this second chance with the publication of the second edition of my *Study of Orchestration*.

I am grateful, first of all, for the opportunity to correct a host of minor errors that crept into the first edition and for which I take full responsibility, since my proofreading skills are sorely deficient. Many of my composer colleagues can empathize with me since so many of us suffer from the same deficiency. When we correct our scores, we think we see the correct pitches, since those were imprinted on our psyches, when in fact there may be mistakes which we simply cannot recognize. This seems to have been the case from time to time in the first printing, and it is my sincere hope that the most egregious errors have now been removed.

In the course of the first edition's lifetime, various well-meaning colleagues pointed out statements which could be misinterpreted and others which needed clarification. All suggestions were carefully considered and dealt with to the best of my ability. Nevertheless, some compromises were necessary because of space and pedagogical considerations. It is my firm conviction that despite these occasional constraints, the second edition will answer the needs of even more teachers, students, and professionals than the first.

Secondly, I am grateful for the chance to shed additional light on the various ways the book may be used. Possibly the major purpose of this volume is to teach music students the practice of instrumentation and orchestration. In order to accomplish this, it is vital for these novices to become familiar with the most important, and often most quoted, excerpts from the orchestral literature. Certainly, this book contains many excerpts duplicated in other orchestration texts, but this is unavoidable. My publisher has allowed me to include more examples than are contained in any other one-volume book

because we understand how crucial it is for a student to see and hear excellent and relevant examples of each instrumental sound, each orchestral choir, and, of course, the entire orchestra. In the first edition, I provided lists of additional works to be studied; these lists have been expanded and will now be found at the end of every section instead of only sporadically. It is my hope that, through this supplementary information, an even broader insight into each of the components of the orchestra as well as into the whole ensemble will result.

One of my own greatest learning experiences took place during my orchestration sessions with Aaron Copland as a student at Tanglewood. These lessons consisted of listening first and then analyzing various composers' orchestrations. Copland claimed that if you had a composer's idiosyncratic orchestral sound firmly fixed in your mind, you could take any non-orchestral piece by that composer and orchestrate it as he would have done. Similarly, by exposing yourself to a multitude of styles and internalizing their sounds, you will be able to realize on paper anything you can hear in your mind or inner ear. I'm convinced that this strategy has great merit and have seen it work time and time again in thirty-five years of teaching. It is for this reason that I have emphasized listening to each excerpt in the book and to this end, we continue to have new and better *Listen and Score* exercises throughout the Workbook. In addition, we have created, for the first time in textbook history, a set of fully professional CDs which offer you faithful performances of every music example in the book. Certainly, a course in orchestration would be perfect if an orchestra could be present at all times. In the absence of such perfection, it is hoped that these recordings will represent an acceptable substitute and will effectively demonstrate the desired sounds. The major objectives of this book in its second edition are similar to those of the first: to serve as a textbook for students wishing to perfect themselves in the art of orchestration, and to serve as a reference book for composers, arrangers, and performers.

For the most part, we have limited ourselves to discussions of instruments found in the orchestra and in orchestral literature from around 1730 to the present; therefore, there is no chapter devoted specifically to Renaissance or Baroque instruments. However, those instruments that have enjoyed some currency since 1730, such as the viola d'amore or the oboe d'amore, are given proper space in the book. The same is true of instruments used exclusively in bands and ethnic orchestras.

As I have stated before, most of the music examples in this edition are taken from often-heard standard orchestral works whenever possible. However, some uniquely twentieth-century instrumental innovations from the solo or chamber repertoire are included. In this

connection it must be pointed out that quite a few of these new sounds are either too soft for orchestral use or can be better realized by instrumental combinations unavailable in chamber or solo music. Techniques such as key and valve clicks or pitchless blowing are more effectively used in chamber music performed in smaller spaces where these special sounds can be more easily heard. Similarly, while the percussive effect of striking the tailpiece of the violin is certainly a legitimate sound, it can be more precisely rendered by the percussion section, often with more colorful results. While we must realize that there was a great deal of sonic experimentation during the fifties, sixties, and seventies of our century, many effects have not outlived their initial usage. As a matter of fact, while it is dangerous to make blanket statements, I feel it safe to say that in most of the scores of the 1980s, the orchestra is treated in a much more traditional manner than it had been for the previous three decades.

The same may be said about electronic instruments and amplifying devices. While the synthesizer has become one of the most versatile instruments ever invented, it is constantly undergoing revolutionary change and whatever one would write about it today would almost certainly be obsolete tomorrow. Therefore, I have omitted the study of electronic instruments altogether rather than give superficial generalizations. However, I believe these instruments are of tremendous importance in today's sonic landscape; therefore, in Appendix B, I have provided a list of important books and periodicals in which these instruments are discussed and which I recommend especially to the reader interested in popular and rock music.

Now to provide an overview of *The Study of Orchestration*, Second Edition, the accompanying Workbook, and the set of compact discs.

The book is divided into two parts:

I. Instrumentation

This section deals with the ranges, techniques, and timbres of each of the orchestral instruments. A chapter on each choir (string, woodwind, brass, and percussion) is followed by examinations of the individual instruments within that choir. Finally there is an extended discussion of the instruments of each choir in combination within the family as well as with the other orchestral choirs.

Many of the solo instrumental excerpts are given out of context in order to expose the student to the sound of the individual instrument. A scale or hypothetical group of pitches will not really illustrate instrumental capabilities the way a passage from an actual orchestral score does. Some of these solo passages are later shown in their orchestral context; others are simply used to demonstrate the range or timbres of the individual instrument. Whenever possible, the instructor should play a recording of a particular solo passage as

it appears in its orchestral context. Where there is also a later quote of the excerpt in the orchestral part of the book, a footnote as to its whereabouts is provided.

II. Orchestration

The second section of the book deals with major scoring problems as well as techniques of transcribing piano, chamber, and band music for orchestra. In recognition of the likelihood that many musicians using the book will be teaching in public schools, special emphasis has been given to transcribing orchestral works for the odd combinations that may be found in school or classroom situations. An important chapter on the accepted methods of setting up a score page and copying orchestral parts is also included.

There are two appendices:

A. In a quick reference chart to instrumental ranges and transpositions, I have differentiated between the full ranges of instruments when played by professionals and the more limited ranges of these instruments when played by amateurs or beginning performers. Also available in tabular format are the names of orchestral instruments in four languages with their English abbreviations and some frequently used orchestral terms.

B. A substantial and updated bibliography on orchestration and notation as well as specialized studies of each instrument in the modern orchestra are provided in this section, along with a new list of books on electronic devices.

The Workbook has been designed to accompany the text by providing exercises that test the student's newly-acquired skills at the end of each chapter. For this second edition, the Workbook contains almost entirely new selections to be scored and realized. Several *Listen and Score* exercises are provided to expand the student's grasp of the orchestral medium in very specific ways.

The CD package—a set of compact discs—is available for the very first time. These discs have been recorded under completely professional conditions and contain **all** the musical examples printed in the text as well as the special section of Workbook examples. The recordings are all carefully slated.

* * *

The concluding paragraphs of this preface to the second edition are really the most difficult to write because I wish to acknowledge my indebtedness to so many people who have helped in one way or another with the revision of the book. The outpouring of enthusiasm, support, and encouragement which the first edition engendered has been a great source of inspiration and satisfaction to me. I cannot reiterate too often how much I have appreciated the time and effort

expended by so many of my colleagues to help me shape the book into a more effective learning tool.

While many people deserve to be mentioned by name, I shall only be able to acknowledge a few in the space allowed to me. These include my good friends at the Eastman School of Music, Christopher Rouse, David Liptak, and Allan Schindler, as well as some colleagues at other institutions: Robert Bailey, John M. Lee, Arthur R. Maxfield, Thomas Matta, James Waters, and my very special mentor, Herbert Fromm.

My gratitude also goes to the Ann and Gordon Getty Foundation who generously supported the new recordings of the excerpts from the book as well as the *Listen and Score* parts of the Workbook. The recording itself could not have been made without the complete commitment and cooperation of David Effron, Donald Hunsberger, Thomas Frost, the recording staff at the Eastman School of Music, especially Ros Ritchie, the entire Philharmonia, as well as Catherine Tait, Abram Loft, and Dana Maiben of our faculty.

Last, but not least, I wish to thank my editor at W. W. Norton, Claire Brook, who has been a constant supporter of the first edition and was of tremendous assistance in this second edition. The same applies to my good friend, Leo Kraft, who once again gave me his invaluable advice on specific ways to improve this book.

Samuel Adler

1

The Orchestra—Yesterday and Today

Aristotle, in his famous discourse "On Music," said: "It is difficult, if not impossible, for those who do not perform to be good judges of the performance of others." He, of course, was referring to solo performance on instruments or singing. However, the same may be said of those who must judge the worth, competency, and effectiveness of a piece of orchestral music. Hands-on experience in a specific area of the musical arts makes a composer, conductor, teacher, performer, or student a better practitioner in that particular aspect of music. Since so many musicians deal with the great instrument we call the orchestra, it is most important that the study of orchestration and instrumentation become a basic part of every musician's education.

The orchestra is certainly one of the noblest creations of Western civilization. The study of its intricacies will illumine many important areas of music. After all, timbre and texture clarify the form as well as the content of a host of compositions. Further, specific orchestral colors and even spacing of chords in the orchestral fabric give special "personality" to the music of composers from the classical period to our own time. In a most informative book called *The History of Orchestration*, Adam Carse concludes with this judgment:

> Orchestration has been many things to many composers. It has been a servant of the great, a support to the mediocre, and a cloak for the feeble. Its past lives enshrined in the works of the great dead, its present pants after the exertion of recent progress,

> and its future lies as completely hidden as it lay at the end of the sixteenth century.*

Mastering the technique of orchestration leads one to a deeper understanding of the sensitivity with which the great masters of composition have handled the symphony orchestra and how each made this remarkable instrument serve their musical ideas in the clearest and most vivid ways.

The art of orchestration is of necessity a highly personal one. The orchestral sound of Wagner, for instance, is vastly different from that of Brahms, even though these two composers lived at the same time. In this regard, orchestration is similar to harmony, melody, or any other parameter of music. It is, therefore, imperative that one acquire the basic skills of the art in order to make it personal at a later time. The ear will be the deciding factor in the choice of instruments as well as combinations of instruments. It is for that reason that we shall immediately concentrate on developing the ear and trying to make it capable of listening and distinguishing colors.

It is the goal of this book to acquaint the reader with the distinctive, particular sound each instrument makes in solo and in combination with other instruments, as well as the techniques used to produce these sounds. Thus, when a particular tone color is heard in the inner ear (or mind), it will be possible to write it down in score for realization in performance. Walter Piston put it succinctly: "You've got to hear what you put on that page." Let us call this "hearing mentally."

Compared to the development of other areas in the discipline of music, orchestration, as we know it, is a latecomer. It is very true that instruments have been used since the dawn of history, but they were employed for the most part to accompany voices or improvise during festive occasions. Furthermore, during the Middle Ages and the Renaissance, the composer rarely, if ever, specified the exact instruments which were to perform the various parts, short of designating a "soprano, alto, tenor, or bass" instrument or a color of the string, wind, brass, or keyboard families. In 1740, Leopold Mozart wrote in the preface to one of his *Serenatas* that "if the alto trombone player is inadequate, a violinist should be asked to perform the trombone part on the viola." But, by the middle of the eighteenth century, this was an anomaly rather than the norm, for in the preface to his opera *Combattimento* Monteverdi wrote: "A uniform basic mood throughout a piece postulates an unchanging combination of instruments all the way through."

From that time on, and even perhaps from as early as 1600, the orchestra as we know it began its rather slow development. We learn

* Adam Carse, *History of Orchestration* (New York: Dover, 1964), p. 337.

from such writers as Francis Bacon that in the middle of the seventeenth century in England, there were still two kinds of consorts. He refers to *musica fracta*, the broken or heterogeneous consort, and *musica sociata*, the whole or homogeneous consort. However, orchestras were springing up in many of the courts of Italy, France, and Germany. We may divide the early history into two broad periods: 1) from the beginnings of the orchestra to the death of Bach and Handel around 1750; and 2) from the Mannheim School, Haydn, and Mozart to the present.

During the first period, there was an emphasis on the stabilization of the entire orchestra. The string choir was the first to be exploited because the construction of the four constituent instruments—violin, viola, cello, and double bass—was perfected by the end of the sixteenth century. The institution of public concerts in the eighteenth century was the catalyst for the gradual creation of an orchestra with multiple strings. The advancement of orchestral technique as well as the concern for very specific colors was also considerably aided by the media of opera and ballet. Lully, as early as 1686, used a string orchestra plus two flutes, two oboes, two bassoons, two horns, two trumpets, and timpani. Again, one must say that this orchestra was as yet not universally accepted. Throughout his lifetime, Bach experimented with all kinds of orchestral combinations, especially as accompaniment for his cantatas. In his case, as was so often true of composers of that period, availability of performers largely dictated the constitution of his orchestra. By the time of Haydn and Mozart, stabilization had almost been achieved, and it was accepted that an orchestra, as distinct from a large chamber group, was made up of three different choirs: the strings (first violins, second violins, violas, cellos, and double basses), the woodwinds (two flutes, two oboes, two clarinets, and two bassoons), and the brass (two horns, two trumpets, and timpani). There was no separate percussion section as yet in the standard symphony orchestra, but it did exist in the opera orchestra. Such instruments as snare drum, bass drum, triangle, and cymbals were commonly found in opera scores. Notice, however, that the timpani were classified with the brass in the Classical orchestra. The reason for this was utilitarian, since the timpani invariably played together with the trumpets. Seldom are there cases when the two are used separately. There has always been confusion as to why the trumpets are placed below the horns, even in the most modern orchestral scores, even though the trumpets usually play in a higher range than the horns. The reason is historical: horns were used in the orchestra before trumpets, and the trumpets were placed near the timpani since their music was usually coupled.

From the Classical period on, there was a rapid growth and expansion of the orchestra. First auxiliary instruments were added to

increase the range of the wind choir (such as piccolo, contrabassoon, and English horn) and other instruments were brought into the symphony orchestra from the opera orchestra (trombones, harps, and the larger percussion battery). Huge orchestras were assembled by Berlioz for specific occasions in which the wind, brass, and percussion sections were more than doubled and the string choir was greatly enlarged. By the time of Mahler and Stravinsky, the large orchestra, as we know it today, was an accepted norm. The strings, instead of 6, 6, 4, 4, 2, were 18, 16, 14, 12, 10 (the numbers, of course, stand for the number of players in each of the five string sections). Nor was it uncommon to employ six flutes, five oboes, six clarinets, four bassoons, eight horns, four trumpets, four trombones, two tubas, two harps, piano, and a host of percussion instruments requiring four to five players.

Not only the size of the orchestra increased, but also the sophistication of its use. When it does not matter what instrument plays a certain part, the composer relinquishes responsibility for the orchestration; and, at least from our twentieth-century perspective, is not much concerned with timbral problems. However, as the orchestra became a huge apparatus and every note, chord, timbre, and nuance became an integral part of the composition, it was necessary to codify the art of orchestration so it could be taught. Some of the great orchestrators of the nineteenth century felt compelled to set down their ideas and insights. Two of the outstanding orchestration texts of the last century are those by Berlioz (revised by Richard Strauss) and by Rimsky-Korsakov. Both treatises are concerned with the techniques of each instrument separately and the various combinations that have proven successful in their own works. Rimsky-Korsakov used his own works only to illustrate each point; he was, after all, a great orchestrator and a daring experimenter who provided us with insights and explanations which would not have been possible had he used works by other composers.

It has been said that Maurice Ravel was asked by his publisher to write a book on orchestration. He respectfully declined but was reported to have told his friends that if he were to write such a volume it would include everything in his own orchestral music which, in his view, was an orchestral miscalculation. Since we have come to consider Ravel one of the true giants of orchestration, how very interesting it would have been to have such a book, for one cannot think of Ravel's orchestral writing as weak in any way. In this connection, it is important to note that tastes in orchestration change and some of the problems attendant upon these changes will be discussed in chapters 15, 16, and 17. One should be aware that such great musicians as Wagner, Mahler, Weingartner, Mengelberg, Toscanini, Beecham and

others, took it upon themselves to "improve" upon the orchestrations of Beethoven and Schumann symphonies to suit the larger orchestras and the fashion in orchestral sonorities of the late nineteenth and early twentieth centuries. It should also be mentioned that Mozart reorchestrated Handel's *Messiah*, adding clarinet and trombones to the original in order to satisfy the ears of the late eighteenth-century audiences.

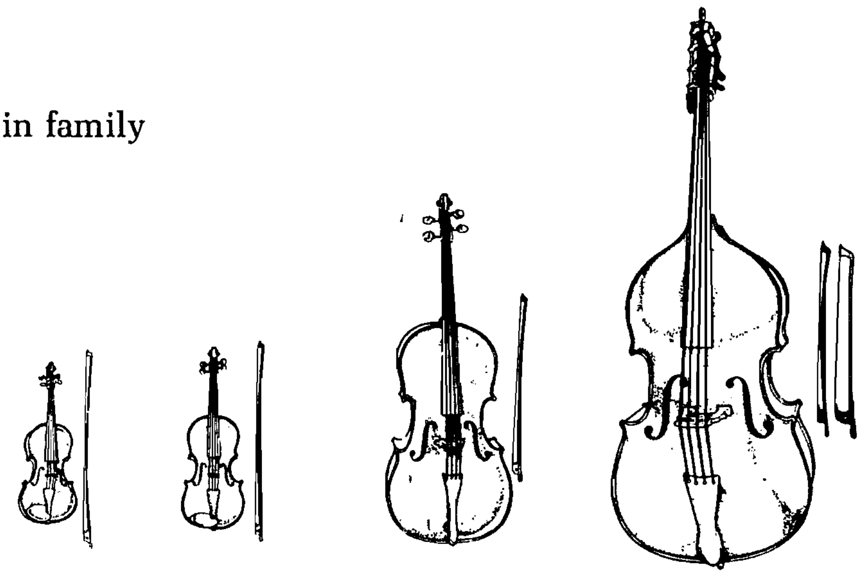
The art of orchestration today is a most sophisticated and intricate one. It is also highly individual, depending greatly on the taste and even the prejudice of the composer or orchestrator. Realizing this, one should master the techniques of writing for each instrument and listen carefully to the various combinations. Much can be learned from reducing a full score to its bare essentials so that it may be performed on the piano, or from "blowing up" a score from a piano part. This kind of activity has been common practice for well over one hundred years and offers invaluable lessons about clarity and coloration in the orchestra. Such fabulous orchestrators as Ravel, Debussy, and Stravinsky often composed their most advanced orchestral scores originally for piano and then orchestrated them, while Webern and Berg zealously made piano arrangements of huge orchestral scores by Schoenberg and Mahler in order to make them easier to study. In our time, the composer or orchestrator is often called upon to reorchestrate certain works for our large music-education establishment. During the course of this book, all these and other practical possibilities will be discussed. It is hoped that the organization of this text will facilitate fulfilling any task in orchestration that arises.

Throughout the book, the instruments most commonly used in the modern symphony orchestra receive the broadest exposure. On the other hand, with the advent of so many Renaissance ensembles and heterogeneous large chamber groups, it was deemed important to include instruments peculiar to such ensembles, and describe basic techniques and concepts associated with some of these instruments. In an appendix, some bibliographic references are given in case further information is desired about the instruments that are discussed less thoroughly.

2

Bowed String Instruments

The Violin family



violin viola cello double bass

The modern symphony orchestra is usually divided into four choirs: strings, woodwinds, brass, and percussion. The bowed string choir—violins, violas, cellos, and double basses, technically called *chordophones**—was the first to be fully exploited. This preferential treatment may be explained on two counts: the strings, of all the choirs, have the greatest number of special properties in common; and the "violin family," as it is sometimes called, reached its present state of technical perfection in construction by 1700.

* The term for musical instruments that produce sound by means of strings attached between fixed points. (See also p. 370–71 and 402)

Some other reasons for the chordophones' priority position as the first fully developed choir of the modern orchestra are:

1. The tone color of the string group is fairly homogeneous from top to bottom, variations in the different registers being much more subtle than in the winds or brasses.
2. The range of the group is enormous, encompassing seven octaves between the double basses and the violins.
3. The group has a wide dynamic range from an almost inaudible pianissimo to a most sonorous fortissimo.
4. As string tone is rich in overtones, all manner of close and open spacing is practical; this property produces that particular warmth and vibrancy which lends itself so well to the performance of *espressivo* passages. Further, perhaps because of this quality, one does not seem to tire of hearing string sound for extended periods of time.
5. String instruments are most versatile in producing different kinds of sound (bowed, plucked, struck, etc.) and can easily perform rapid passages, slow sustained melodies, skips, trills, double stops, and chordal configurations, as well as special (even extramusical) effects.
6. Strings are "tireless" and can play any kind of music without a rest, while a wind or brass player usually needs to stop from time to time to breathe.

The string section of a full symphony orchestra consists of the following number of players:

1st Violins	16 to 18 players	8 or 9 stands
2nd Violins	14 to 16 players	7 or 8 stands
Violas	10 to 12 players	5 or 6 stands
Cellos	10 to 12 players	5 or 6 stands
Double Basses	8 to 10 players	4 or 5 stands

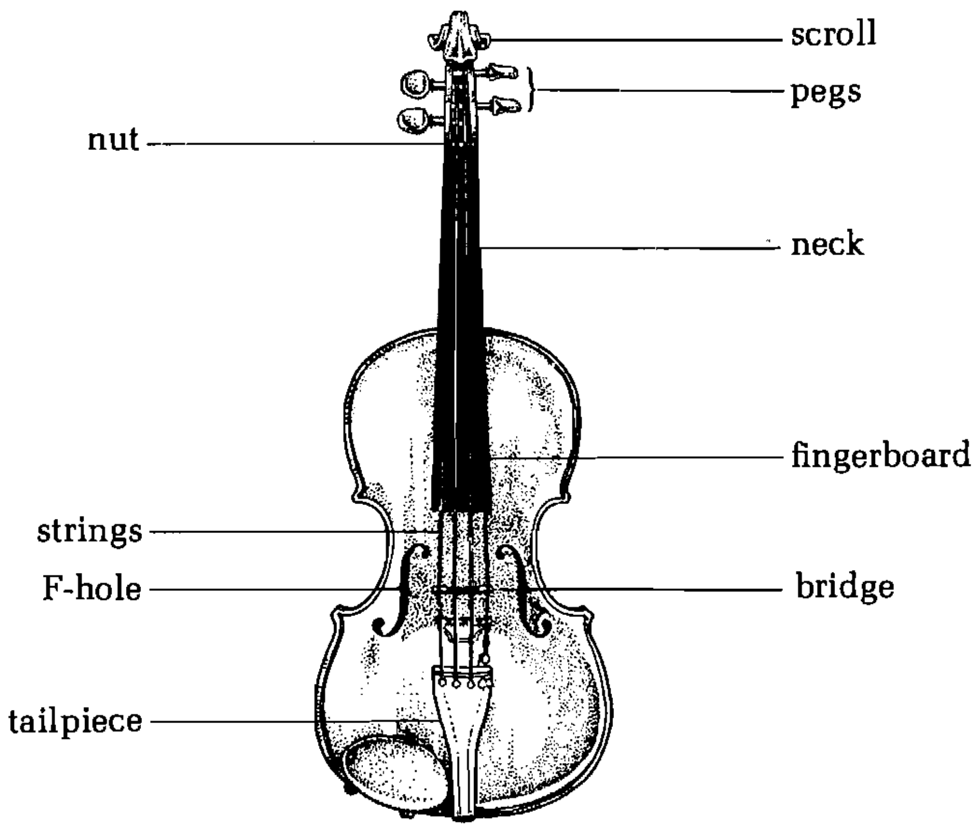
CONSTRUCTION

Not only is the construction of all bowed string instruments identical, but there are certain techniques common to the entire group of chordophones, which are best discussed together as a prelude to separate consideration of each instrument. Some of these techniques will have slight variations and modifications for each of the four instruments. However, discussing the group as a whole will clarify the basic principles, as well as the application of the techniques, properties, problems, peculiarities, and their execution on the four instruments.

Since we shall use some structural terms throughout this discussion, it is vital that we examine both structure and nomenclature at the very outset.

Except for the proportions, which will be given as each instrument is considered separately, it must be noted that the construction of all the instruments, as well as the names of the different parts, is identical to that of the violin diagram drawn below.

Each instrument consists of two main parts: the body and the neck. Both are made of wood. The top surface of the body, called the *belly*, the *table*, or the *soundboard*, and the bottom, called the *back*, are both curved. Together with the sidewalls, called the *ribs*, they form a hollow box which acts as a resonator and strengthens the vibrations of the strings. The overall shape of the body somewhat resembles the human form; it also appears to have a waist. Inside the body is a *soundpost*, which transmits the vibrations of the strings. The neck consists of a long, thin, shaped piece of wood, called the *fingerboard*. At its upper end is a *pegbox*, which holds the tuning pegs, and a small curved section above the pegs, called the *scroll*. Over the fingerboard and belly are stretched four strings, or in the case of the double bass, sometimes five. The strings, each wound around a tuning peg, pass thence over a small piece of wood, called the *nut*, along the fingerboard, then over another piece of wood, called the *bridge*, and are attached to a third piece of wood or plastic,



called the *tailpiece.* When a bow rubs across the string between the place where the fingerboard ends and the bridge is positioned, the string is made to vibrate, producing a sound. The bridge, which supports the strings, is also made to vibrate; its vibrations, in turn, pass to the belly and, to a lesser extent, to the back. Cutting through the belly are two sound holes, called *F-holes* because they resemble that letter in the alphabet. They permit the belly of the instrument to vibrate freely, and also provide sound-exits from the body of the instrument.

TUNING

Three of the instruments of the violin family, the violin, viola, and cello, are tuned in fifths, while the fourth, the double bass, is tuned in fourths.

Here are the pitches of the open strings of the instruments. The term *open strings* refers to the strings as they sound when they are not touched, or stopped, by any of the fingers of the left hand.

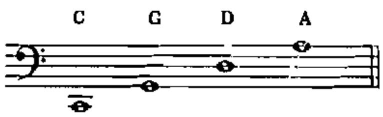
Example II–1. *Tuning of the Four Violin Strings*



Example II–2. *Tuning of the Four Viola Strings*



Example II–3. *Tuning of the Four Cello Strings*

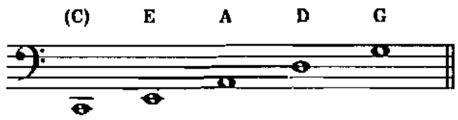


Example II–4. Tuning of the Four Double Bass Strings



A five-string double bass has a low C-string added by means of a mechanical extension. The tuning of a five-string bass is:

Example II–5.

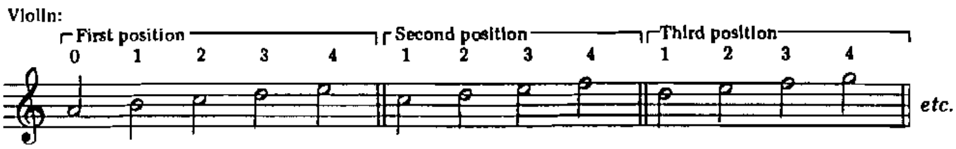


The double bass is the only transposing instrument of the violin family, for it sounds one octave lower than written.

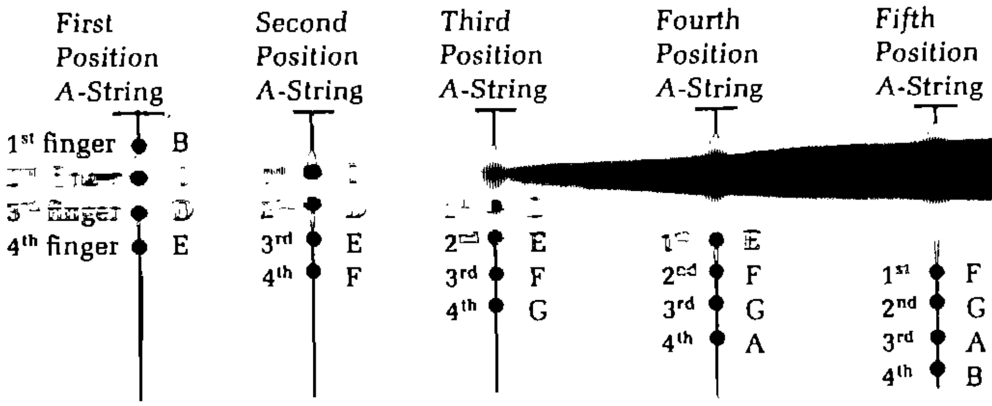
FINGERING

In order to produce pitches higher than those of the open string, the string is firmly pressed against the fingerboard with the fingers of the left hand, thus shortening the sounding length, and consequently raising the pitch. The string itself vibrates only between the bridge and the nut. The left hand therefore moves from a position closest to the nut (*first position*) up the fingerboard toward the place where the bow is drawn across the string (between the end of the fingerboard and the bridge). As the hand moves up in order to produce higher pitches, it shifts from one position to another. It must be remembered that the index finger of the left hand and not the thumb is called the first finger. The shifting is executed in the following manner:

Example II–6.



Here is the fingering for the five basic positions of the violin and the viola:



The principle of fingering is the same on all the bowed string instruments, but the details are quite different for the cello and the double bass and, therefore, will be discussed in greater length in the special sections devoted to each instrument.

DOUBLE-STOPS

Two notes on adjacent strings played simultaneously are called *double-stops*, of which there are two kinds:

1. those in which one of the notes is an open string;
2. those in which both pitches are stopped.

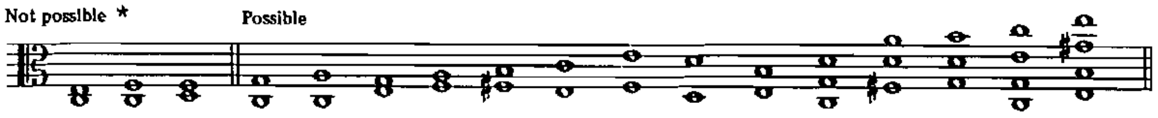
On all string instruments it is possible to play two notes on adjacent strings at the same time by fingering the two pitches and then having the bow drawn across both strings at the same time. Chords of three and four pitches, if they occur on adjacent strings, are also possible and are called *triple-* and *quadruple-stops*. With triple-stops greater bow pressure has to be exerted on the middle string of the three sounded so that all three can sound at the same time. For this reason, the simultaneous attack of three notes can only be accomplished at a greater dynamic (*f* or *mf*). When piano or pianissimo triple-stops are desired, the performer usually has to arpeggiate them slightly. When performing quadruple-stops, it must be remembered that the bow is only able to sustain properly two pitches at a time. (In the seventeenth and early eighteenth centuries, the bow was more curved than it is now and it was possible to sustain four-chord notes more readily. The curve of the wood was outward, while the modern bow is curved slightly inward.) Therefore, all quadruple-stops must be arpeggiated. The most successful triple- or quadruple-stops have one or two open notes, since these have a greater sustaining power. Here are some examples of simple double-, triple-, and quadruple-stops for each of the four instruments. A much more complete chart will be found in the chapters in which each instrument is discussed separately.

Example II–7. Violin



* Both pitches are on the same string.

Example II–8. Viola



Example II–9. Cello



Example II–10. Double Bass: Only double-stops that include an open string are practical.



DIVIDED STRINGS

Divisi (It.), *Divisés* (Fr.), *Geteilt* (Ger.)

Since there is more than one player for each string part in a symphony orchestra, double notes (double-stops) are usually divided between the two players on the same stand. To signal this division, the part should be marked *divisi*, or its abbreviation, *div*. It is the custom for the player on the right side of the stand ("outside") to perform the upper notes, and the one on the left side (or "inside") to play the lower notes. If the word *divisi* does not appear in the parts, the player would be correct in performing the chord as a double-stop. When *divisi* is no longer in order and the part returns to single notes, the word *unisoni* (or more commonly the abbreviated, *unis*.), should appear on the part. Some composers wish to have each player perform double-stops. In that case, it is safer to write *non div*. so that no division between the two players will occur.

* Both pitches are on the same string.

Example II–11. Debussy, *Nocturnes: Nuages*, mm. 5–15. (Strings only)



When triple- or quadruple-stops are to be divided, it is helpful to specify how this is to be done.

Example II–12.



If the composer wants the triple-stops to be performed by three different players, the parts should be marked *div. a3*, or in case of quadruple-stops, *div. a4*. If the division is to occur by stand, that is, first stand play the top note, second, the next lower, and so on, it is best to write out three or four different lines in the part and put the direction "Divide by stand." The Italian for "by stand" is *da leggii;* French, *par pupitres;* German, *Pultweise.*

In the following example, the composer has not only indicated the division by stand to the left of the score, but has also specified *divisi* (*geteilt*) instructions for each stand within the body of the score.

Example II–13. Strauss, *Also sprach Zarathustra,* [27]



In a passage where a composer wants only half the section to play, the part should be marked "half" (in Italian, *la metà;* French, *la moitié;* German, *die Hälfte*). The "inside players" will then remain silent during such a passage. When all are to play again, the word "all" (or *tutti* [It.], *tous* [Fr.], *alle* [Ger.]) must appear on the score.

VIBRATO

When a finger is pressed down on a string and sustained for any length of time, most string performers will use *vibrato* to enhance the beauty of the tone. It is accomplished by placing the finger firmly

on string at the desired pitch while performing a rocking motion in the direction of the length of the string. Besides enhancing the beauty of the tone, the use of *vibrato* increases the emotional quality and intensity of the pitch without distorting the essential frequency. A composer or orchestrator may ask for *non vibrato*, or *senza* (without) *vibrato*, if a white, pale sound is desired. Obviously an open string cannot have a fingered vibrato, but can be made to sound as if it were vibrating in either of two ways: by fingering (oscillating) the note one octave higher on the next string to set up sympathetic vibrations; or by vibrating the stopped (unison) equivalent. This latter effect can, of course, only be produced for the upper three strings.

GLISSANDO, PORTAMENTO

This is another fingered effect common to all string instruments, accomplished by sliding one finger on one string from one pitch to another. It is usually indicated by a line connecting two noteheads with or without the word *glissando* (*gliss.*) above the line. When it is done correctly, it will be executed on one long (legato) bow stroke, and all the pitches will sound, or at least be touched, between the first and last note. It is possible to glissando upward as well as downward on a string.

There is very little difference between the terms *glissando* and *portamento*. If one wishes to make a distinction, portamento is a natural, expressive way of connecting melody notes which are a great distance apart and is rarely indicated in the score. Glissando is a deliberate, notated effect. Nevertheless, one may still find composers marking *port.* instead of *gliss.* when they want a conscious slide from one pitch to another.

Example of glissandi:

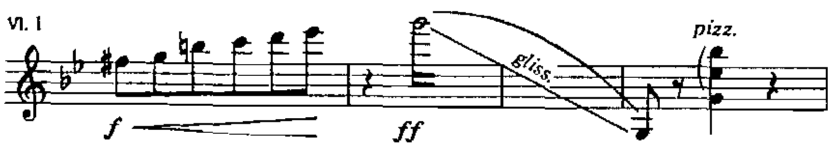
Example II–14. Bartók, *String Quartet No. 4*, second movement, mm. 230–50.





If a glissando is to be performed over more than one string, it cannot be a "true" glissando, for it must be broken as soon as the open string is reached, and the player must improvise more sliding on the next string, or play a chromatic scale until the desired pitch is reached.

Example II–15. Ravel, *La Valse*, 3 measures before 27

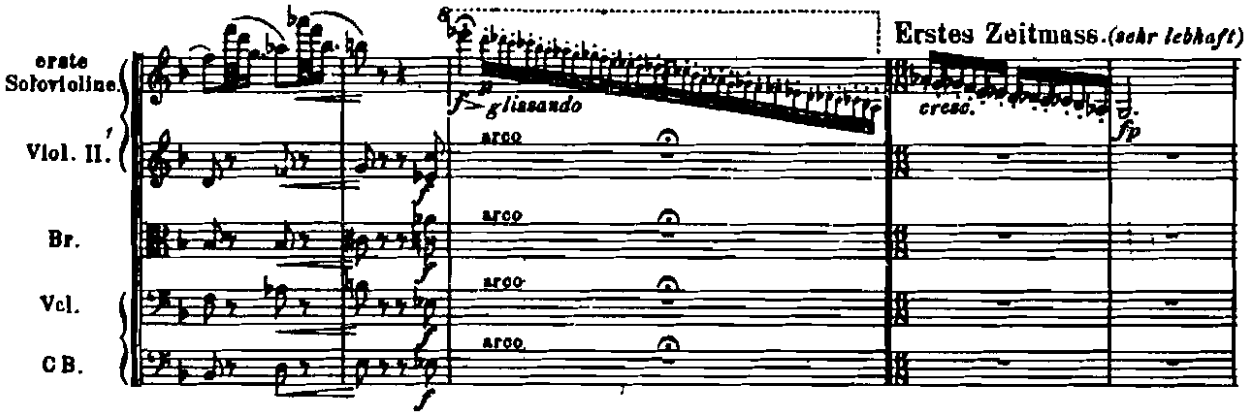


Example II–16. Mahler, *Symphony No. 4*, third movement, mm. 72–76



There is one other kind of glissando, which may be called a "fingered glissando." It is found most often in solo literature or in string solos during an orchestral work. Sometimes called the "written-out" *glissando*, every pitch is usually notated.

Example II–17. Strauss, *Till Eulenspiegel*, mm. 205–9

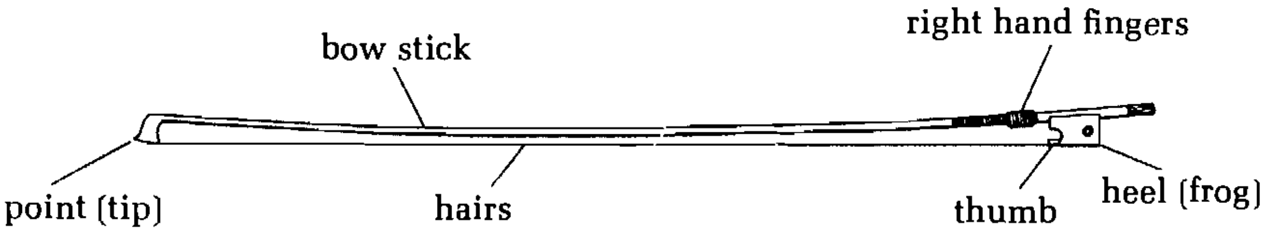


THE BOW

The bow, with which most violin family instruments are played, derives its name from its initial resemblance to the bow used in archery. We find even today that Arabian and Far Eastern "fiddles" are still played with curved bows as were European string instruments until around the fifteenth century. For the next 300 years or so, various experiments brought the shape of the bow closer to what we know today. Corelli, Vivaldi, and Tartini still used bows that were slightly curved outward. Its final form—curved inward—was achieved in the Classical bows of François Tourte (1747–1833). The Classical, as well as modern bows, have the following characteristics:

1. A long tapering *bow stick* which is curved slightly inward toward the hair. It is usually made of Pernambuco wood.
2. A metal or ivory plate protecting the tip.
3. Horse-tail hair.
4. A metal ferrule (brace) at the frog which encircles the hairs and keeps them evenly spread.

Diagram of Bow



5. Exact proportional measurements for balance.
6. A metal screw with which the hair is tightened or loosened.

When the hair is tightened, the elastic quality of the wood gives the entire bow a resilience that makes it possible to execute any kind of stroke desired. The tension of the hair is of the utmost importance.

The bow is held firmly but flexibly between the four fingers and thumb in the right hand (with the exception of left-handed violinists). There are other bow hand positions, especially for the cello and the double bass, which we shall examine in specific detail when we discuss these two instruments.

BOWING

Bowing refers to the act of drawing the bow across the string. As we have said, the bow is normally drawn across the string midway between the end of the fingerboard and the bridge. In order to alter the sound of the instrument, the bow may be drawn across the string at different places.

Two symbols must be remembered: ⊓ down-bow, from the frog, drawing the bow toward* the tip; V up-bow, drawing the bow from the tip toward* the frog.

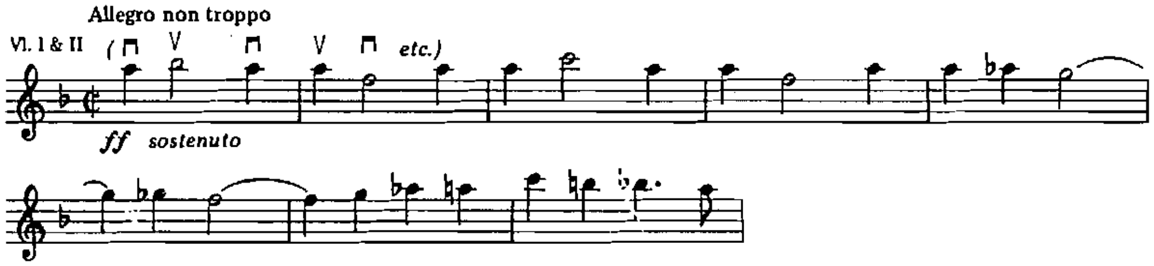
A passage on any of the string instruments may be bowed effectively in a variety of ways, and even the most experienced concertmasters often disagree as to the best way to bow a given passage. Even now, bowing changes are constantly introduced in such well-established clssics as Haydn, Mozart, and Beethoven symphonies. Bowing decisions are greatly influenced by: a) the style of the music; b) its character; c) the tempo and the dynamics at which the particular work or passage is to be performed.

The composer or orchestrator should keep the following facts in mind, for these, at least, are always constant:

*The word *toward* is used because the performer does not always use the whole bow, meaning all the way from the frog to the tip and vice versa.

1. If no slurs are marked (*non legato*), each note requires a change in the direction of the bow, whether the passage is slow or fast.

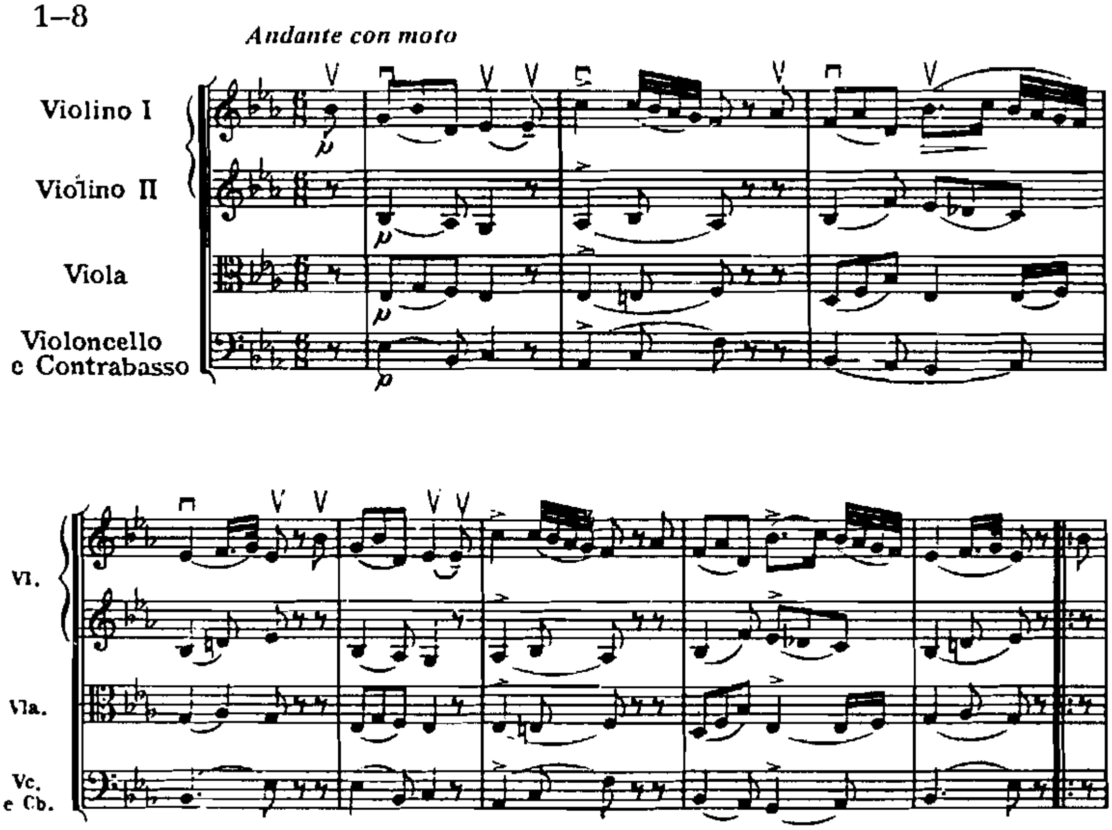
Example II–18. Franck, *Symphony in D minor*, first movement, mm. 129–36



Even though changes of bow direction occur between each one of the notes above, one does not necessarily perceive these changes, since skilled performers can play the successive notes without a break or any audible difference between up- and down-bow.

2. Whenever a passage is slurred, all notes under that slur are performed on one bow, meaning all are played in one direction. This is called *legato* playing. (*Legato* means "bind together.")

Example II–19. Schubert, *Symphony No.* 5, second movement, mm. 1–8



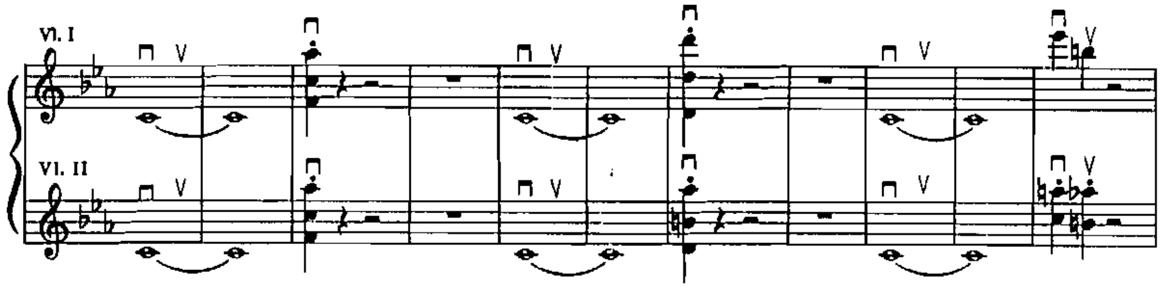
Two observations concerning the example:

1. A performer will naturally begin an anacrusis, or upbeat, with an up-bow (V) unless the composer marks the upbeat with a down-bow sign (⊓).

2. A very common type of bowing instruction occurs on the second beat of the first measure: two up-bows are called for in order to have a down-bow on the accented first beat of the next measure. The violinist will play the quarter-note E♭, then stop his bow movement ever so briefly (the dash under the note indicates separation) before playing the eighth-note E♭ while still in an up-bow motion.

Sometimes two vigorous articulations follow one another, and a double down-bow situation is called for, as in the following example. A down-bow and up-bow should be marked over the long note so that the following attack will be solid. The bow is changed almost immediately to up-bow and is then ready to give a *ff* attack on the triple-stop.

Example II–20. Beethoven, *Coriolanus Overture*, mm. 276–86



If this passage is executed well, the bow change will hardly be noticed.

It is important to remember that one is able to play louder and heavier toward the frog of the bow than toward the tip, because the pressure from the right hand holding the bow is much greater at the frog. The tendency to play a crescendo with an up-bow is quite natural due to the increasing leverage of the right hand on the bow toward the frog. Conversely, there is a tendency to perform a diminuendo with a down-bow. When bowing a passage, the composer should be aware of these tendencies and, without overmarking the parts, should indicate bow direction only where he wishes to counteract the normal habit of the players.

Never mark long phrase slurs in string parts. Such slurs only confuse the performer. The only slurs that should be used are the ones that designate the notes to be performed on one bow (legato).

There is a limit to how many notes can be played slurred on a single bow stroke. This is largely determined by the tempo and the

dynamics governing a particular passage. In a fast but soft passage, a great many notes may be slurred together.

Example II–21. Mendelssohn, *Symphony No. 4*, first movement, mm. 378–83



A similar passage in the violas some measures later in the same movement shows only six notes on a bow, since the dynamic is forte.

Example II–22. Mendelssohn, *Symphony No. 4*, first movement, mm. 461–64



Even if the dynamic is soft, special caution must be taken in slow passages not to overload the bow and make the music physically impossible to perform. Remember also that the cello and bass bows are a bit shorter than those of the violin and viola.

For instance, this passage

Example II–23. Liszt, *Les Preludes*, mm. 28–34





is impossible to perform as the composer has marked while still adhering to the crescendo marks, unless it is broken up into several bows in either of the following ways:

Example II–24



Example II–25



By dividing the section and staggering the bowing among the players, one can produce a very long and effective legato line.

Besides the single bow stroke (*non legato*) and the slur (legato), there are various special types of bowings. Once again, all of these depend greatly on the speed and the dynamics, but are also much influenced by the style and the character of the music.

In discussing these types of bowings, we run up against an even greater diversity of views as to the meaning of each term and its execution. In addition, the terminology itself is not universally accepted, and quite often there are several names for a particular bowing in a given language. The only rational or safe way to classify the bowings is by dividing them into:

1. bowings played on the string
2. bowings played off the string ("bouncing bow")

ON-THE-STRING BOWINGS

Détaché (separate)

This is the basic stroke on all bowed string instruments. It changes direction for each note. Discussed previously as *non legato* bowing, this kind of bowing is sometimes referred to as "separate bows." The change of bow can be made without a break in the tone. But this *détaché* stroke is usually performed so that one hears the articulation of the bow changes. However, the notes are not so detached, marked, or accented that the effect could be called *staccato*. Ordinarily, the middle to upper third of the bow is used for best result in performing this stroke loud or medium loud at a rapid tempo.

Example II–26. Tchaikovsky, *Romeo and Juliet*, mm. 141–43



There are instances in which the composer asks that a passage be played at the tip in order to achieve a quality of extreme lightness. The marking for this effect is: at the point; *a punta d'arco* (It.); *à la pointe* (Fr.); *an der Spitze* (Ger.).

Example II–27. Bartók, *Concerto for Orchestra*, fifth movement, mm. 8–13



Conversely, composers ask for a passage to be played at the frog to take advantage of a heavy stroke which can be produced there. The marking for this effect is: at the frog; *al tallone* (It.); *au talon* (Fr.); *am Frosch* (Ger.).

Example II–28. Gluck, Overture to *Iphigenia in Aulis*, mm. 19–29

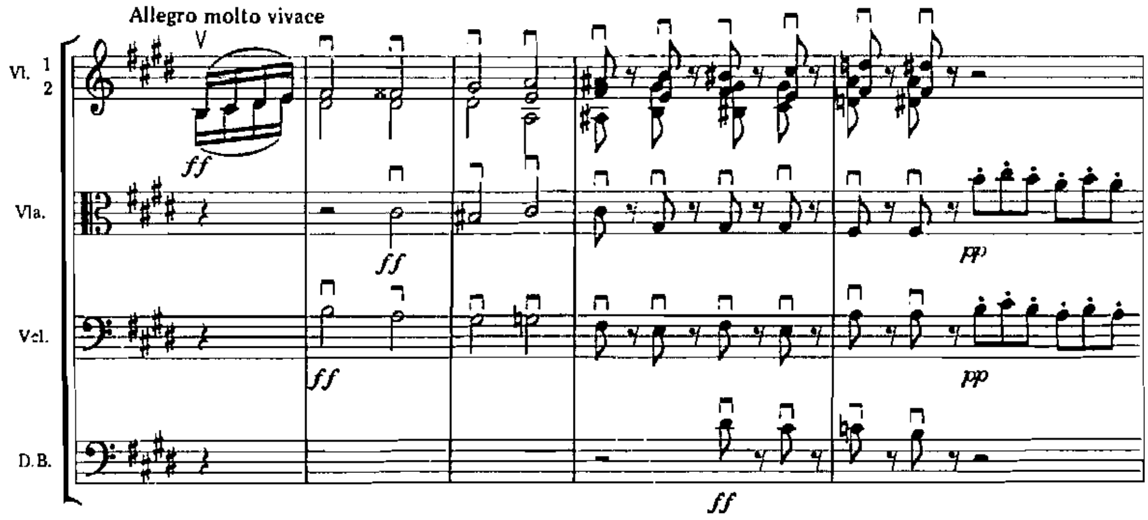


A very heavy and vigorous feeling is commonly achieved by a series of down-bows. This can be played quite fast, with the bow raised between each down-bow. It is most often performed at the frog. (See Example II–29.)

Louré or Portato

This bowing, also called *piqué*, is a legato stroke, but a slight separation of the notes is effected while the bow is being drawn. It is a very expressive bowing used quite often in accompaniments. *Louré* is easily played both up- and down-bow. This effect is indicated by dashes under or over each of the noteheads, with slurs to designate the bow changes. (See Example II–30.)

Example II–29. Tchaikovsky, *Symphony No. 6*, third movement, mm. 108–12



Example II–30. Handel, *Messiah*, "Comfort Ye," mm. 1–4



Staccato

Staccato comes from the Italian word "staccare," meaning to detach or separate. It is best to limit the meaning of staccato for bowed string instruments to an on-the-string effect, which may be performed by separate short strokes, or by having a series of short notes separated on one bow stroke, either up- or down-bow. Staccato is indicated by placing a dot over or under the notehead and is most effectively performed at moderate to slow tempos for reasons that will be clarified later. Staccato passages can be played loud or soft.

Example II–31



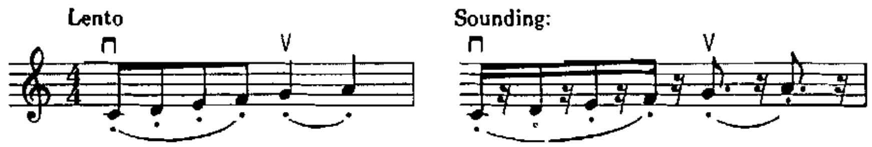
Because staccato bowing separates or leaves a space between the notes, this passage could sound approximately:

Example II–32



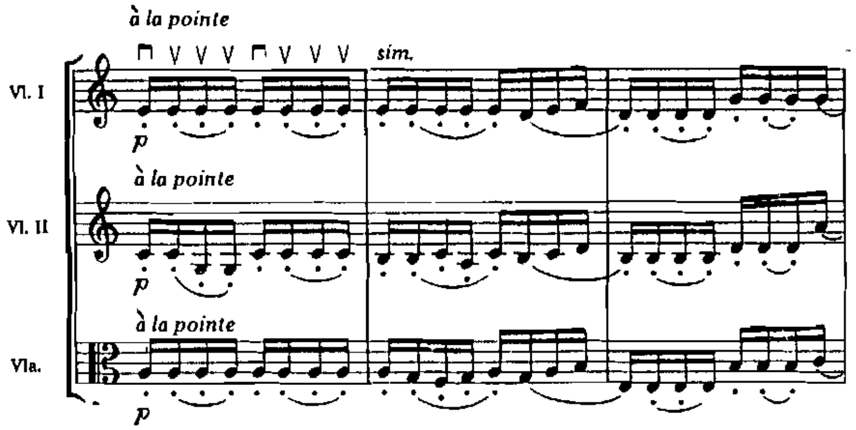
If this kind of staccato is called the *separate bow staccato*, another kind should be named the *slurred staccato*.

Example II–33



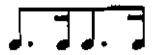
A *staccato* passage like the following is executed very much like *louré*, except that the notes are shorter (staccato) and, therefore, the space between them is longer, as in the examples above.

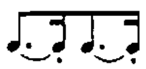
Example II–34. Stravinsky, *Orpheus*, Pas de deux, [109]



Notice that all the tempos for the staccato passages have been moderate, for a fast tempo will invariably be played off the string, with a bouncing bow. Then it should no longer be called staccato, but rather spiccato, or saltando, both terms to be discussed in the off-the-string section of this chapter.

Two other variations of the staccato on one bow, or slurred staccato, technique are very common:

1. In fast passages,  or 

is performed  or 

Notice the way it is notated; the staccato dot is placed under the short note. If both were dotted, the long note would be measurably shortened in performance.

Example II–35. Berlioz, *Symphonie fantastique*, fourth movement, mm. 140–43



2. In order to make  sound crisp and light, the composer often asks to have it played with separate bow at the tip.

Example II–36. Weber, Overture to *Euryanthe*, mm. 149–52



Martelé *(Fr.)*; Martellato *(It.)*; *or* Marcato *(It.)*.

The derivation of this term is from the verb to hammer. In bowing it indicates a fast, well-articulated, heavy, separate stroke, resembling a sforzando, or pressed accent. While *martelé* bowing is usually performed toward the frog of the bow, it can be done in the middle portion of the bow as well. The bow does not leave the string, even though there is a stop between the notes, and each new stroke is initiated with a heavy accent. Sometimes, instead of a simple dot, one of the following signs is placed over a note:  or  or 

Example II–37. Bruckner, *Symphony* No. 9, second movement, mm. 52–58



OFF-THE-STRING BOWINGS

Spiccato or Saltando

There are two distinct kinds of spiccato, or saltando, bowings. One may be thought of as the conscious spiccato, the other as the spontaneous spiccato. Both of these related effects depend on the speed and the dynamic of a particular passage.

1. Conscious spiccato: In a slow or a moderate tempo and at a soft dynamic, the player makes a conscious effort to make the bow "spring." The pressure of the right hand is reduced, and the wrist drops the middle of the bow on the string in a semicircular motion. The notation is similar to the staccato designation, for one places dots above or beneath the noteheads. The lightness and speed required in the passage determine whether one uses a conscious spiccato, or saltando, as it is sometimes called.

Example II–38. Beethoven, *Symphony No. 1*, second movement, mm. 154–56



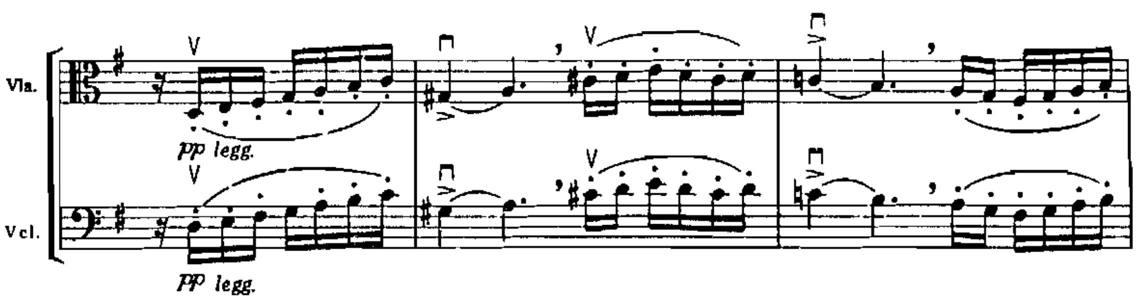
2. Spontaneous spiccato: At a fast tempo with soft dynamics, the player does not have to make a conscious effort to lift the bow; rather, the short quick up–down motion controlled by the wrist alone makes the bow bounce spontaneously off the string with every stroke.

Example II–39. Rossini, Overture to *William Tell*, mm. 336–43



3. Slurred spiccato: This is very much like the grouped or slurred staccato, except that each of the notes is played off the string.

Example II–40. Mahler, *Symphony No. 4*, first movement, mm. 21–23



Jeté (sometimes called ricochet)

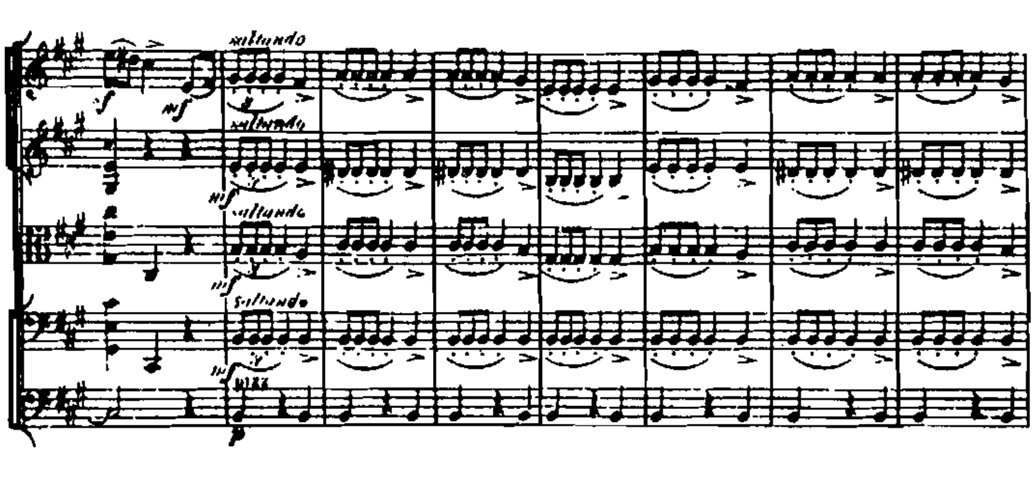
The upper third of the bow is "thrown" on the string so that it will bounce, producing from two to six or more rapid pitches. Usually, *jeté* is executed by a downward motion of the bow. However, it can be played up-bow as well.

One should be warned that the more notes desired on one bow stroke, the more impractical this bowing is. In an orchestral situation, it is suggested that not more than three bouncing notes at a time be used in this bowing. Solo players are perhaps more capable of including many more well-articulated notes on a single bow. Once again, remember also that the bow of the cello and double bass is slightly shorter; therefore, three, or at the most, four notes to a single jeté stroke are quite enough.

Example II–41. Rimsky-Korsakov, *Capriccio espagnol*, third movement, mm. 18–23



Example II–42. Rimsky-Korsakov, *Capriccio espagnol*, fifth movement, mm. 89–96



Arpeggiando

A slightly different kind of spiccato, related to *jeté*, is the effect called arpeggiando. This may begin with a simple slurring of an arpeggio played over three or four strings at a moderate tempo:

Example II–43



But, as the passage gets faster, the performer will spontaneously let the bow jump off the string because of the motion of his right wrist. Of course, when you begin an arpeggiated passage at a fast tempo, the bow will bounce right away, and the arpeggiando effect will naturally occur. It is most often used in solo string and chamber music literature, but is also effective as an orchestral device.

Example II–44. Mendelssohn, *Violin Concerto*, first movement, mm. 328–36



COLORISTIC EFFECTS

Trills

As in all instruments, the trill is extensively used in the strings to color tones. The motion of one finger produces a note that alternates repeatedly with a sustained tone held by another finger. The trill may be performed upward or downward, as the composer specifies. If one of the notes is an open string, the trill is not as effective because the open string quality is so different from that of stopped notes. The performance of a trill by sixteen violins or ten violas creates a most exciting and blurred rhythmic sensation, very different from the sound made by a single player on one instrument. The notation for the trill is *tr*~~~~ over the note.

Example II–45. Hindemith, *Mathis der Maler*, third movement, 16



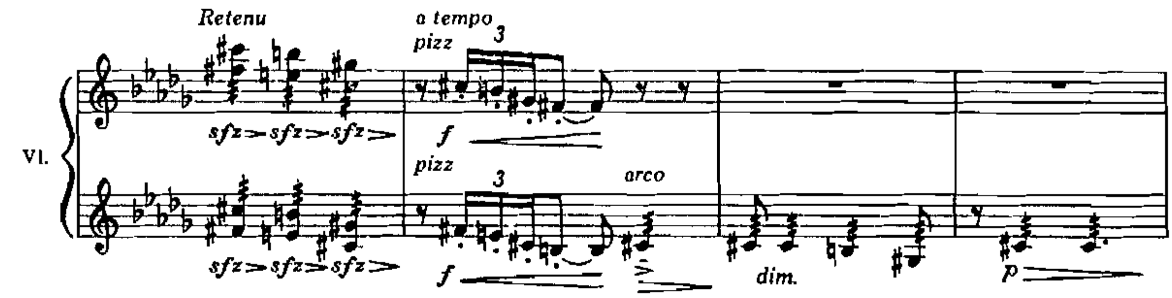
Tremolo

There are four kinds of tremolos:

1. bowed tremolo, unmeasured
2. bowed tremolo, measured
3. fingered tremolo (or slurred tremolo)
4. undulating tremolo (bowed or slurred)

1. Bowed unmeasured tremolo is produced by short, quick up- and down-bow strokes, repeating a single pitch as often as possible during the length of the written note

Example II–46. Debussy, *La Mer*, first movement, mm. 5–8 after [8]



2. Bowed measured tremolo is simply a convenient shorthand for writing a series of repeated *détaché* notes to give more energy or volume to a tone.

Example II–47.



Example II–48. Wagner, Overture to *Der fliegende Holländer*, mm. 319–24



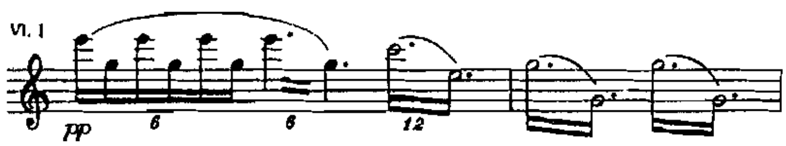
3. The fingered (or slurred) tremolo is the equivalent of a trill at an interval of a second or larger. One usually indicates a precise time value for the notes to make a trill-like effect feasible. It is necessary to slur the notes that are to be alternated to insure the legato movement of the bow. However, there are cases where a fingered tremolo is bowed detached rather than slurred; in those cases, of course, the slur is omitted.

Example II–49. Debussy, *La Mer*, first movement, [8] and measure following



4. The undulating tremolo is used when the two notes in the fingered tremolo are too far apart to be played on one string. The two notes are then played on adjacent strings and the bow undulates between them as quickly as possible. The undulating tremolo may be performed slurred or detached.

Example II–50. Brahms, *Symphony No. 1*, fourth movement, mm. 31–32



On the fingerboard: *sul tasto* (It.), *sur la touche* (Fr.), *am Griffbrett* (Ger.)

In order to obtain a rather flutey, soft, and hazy tone, the composer may ask the performer to play with the bow over the end of the fingerboard. When the term *flautando* is used instead of *sul tasto*, the player should play *near* but not on the fingerboard. The difference is really minimal, and many composers make no distinction between the two terms.

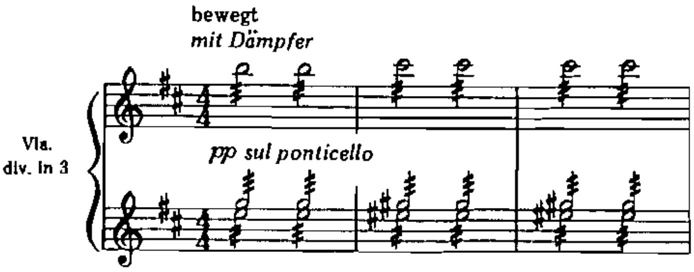
Example II–51. Debussy, *Prélude à l'après-midi d'un faune*, mm. 96–98



On the bridge: *sul ponticello* (It.), *au chevalet* (Fr.), *am Steg* (Ger.)

This effect is produced by playing very near or, in fact, right on the bridge instead of in the regular space allotted for the bow stroke. Since this produces upper partials of the tone not usually heard, it gives the pitch an eerie, metallic, and somewhat glassy timbre. *Sul ponticello* is often combined with bowed or fingered tremolo.

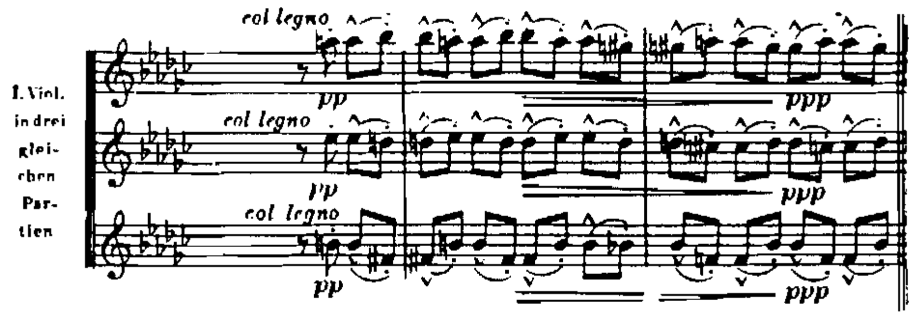
Example II–52. Strauss, *Sinfonia domestica*,



With the wood: *col legno* (It.), *avec le bois* (Fr.), *mit Holz* (Ger.)

1. *Col legno tratto:* For this effect, the bow is turned over, and the sound is produced by the wood rather than the hair. *Tratto* means that the wood is drawn over the string. The sound is very minimal, since the friction of the wood is small compared to the hair, but it again is an eerie effect most useful for tremolo, although sometimes used in legato passages.

Example II–53. Mahler, *Symphony No. 1*, third movement, mm. 135–37



2. *Col legno battuto:* This designation means striking the string with the wood of the bow. It is more commonly used than *col legno tratto*, but it, too, gives very little pitch definition. It is a percussive sound which acts like a very dry and short spiccato; do not expect to hear a definite pitch except highs or lows, depending on which of the strings are struck.

Example II–54. Berlioz, Symphonie *fantastique*, fifth movement, mm. 444–55



Every time a special effect, such as *col legno*, *col legno battute*, *sul ponticello*, or any of the others are used, one must insert the indication *naturale* or *in modo ordinario* in the score at the point where the player should resume his normal playing attitude. The English word *natural* is sometimes substituted, and is perfectly acceptable in American scores.

PIZZICATO

Now we come to another mode of producing pitches on string instruments, namely, by plucking the strings. This is called pizzicato.

The normal pizzicato procedure is as follows:

The violinist or violist usually braces his thumb on the corner of the fingerboard and plucks the strings with his index finger. The

cellist or bassist simply plucks with his index finger, without anchoring his thumb. (Some violinists and violists have also adopted this non-anchored custom.) During a pizzicato passage, the bow is usually held by the other three fingers against the palm of the right hand. However, if the entire piece or a lengthy section thereof is pizzicato, preceded by rests and followed by enough time to pick up the bow, the players may elect to put their bows in their laps or, in the case of a solo performer, on a stand or even on the piano, in order to give them more freedom in executing the plucking.

Whenever pizzicato is desired, the entire word, or more often the abbreviation *pizz.*, must appear in both the score and the parts. When the player is to resume playing with the bow, the word *arco* must be printed. This effect is, of course, used very frequently. For the normal pizzicato, some short time must be allowed for the player to prepare himself to pluck and then again to resume the natural way of playing. There are instances in both solo and orchestral literature when no time is provided for either maneuver, but these are rare and should be avoided if at all possible. (This is especially true of the return from pizzicato to arco, which is a bit more awkward than going from bowing to plucking because the bow must be rearranged into playing position.) However, it is much easier to change from arco to pizzicato, if one figures out the bowing so that the players will have an up-bow stroke just before the pizzicato in order to arrive at the frog. They then have enough leverage on the bow to make the switch more quickly. If no time at all is allowed for the exchange of techniques, many players simply keep their bows in hand, extend the index finger, and pluck the string.

Example II–55. Brahms, *Symphony No. 1*, fourth movement, mm. 1–17





Left-Hand Pizzicato

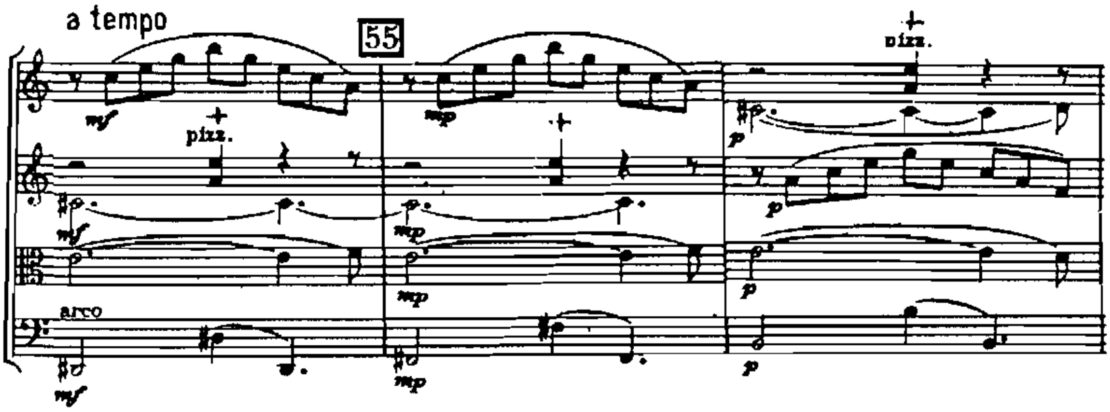
This effect is much more prevalent in solo literature and chamber music than in orchestral works. When a cross, +, appears above a note, it is plucked with one of the fingers of the left hand. Often, these are open strings, and the little finger is used to pluck; other times a whole series is to be plucked with the left hand. In that case, the finger producing the highest pitch plucks the next highest one in the following manner:

Example II–56



The B is played with the bow spiccato, then the fourth finger plucks the A; the third finger, the G; the second finger, the F; the first finger, finally, the open E-string.

Example II--57. Bartók, *String Quartet No. 5*, third movement, mm. 54–56



Fingernail or Snap Pizzicato

These two modes of playing pizzicato are twentieth-century innovations often associated with Béla Bartók's works. The sign for the snap pizzicato is ⦶, and it is accomplished by snapping the string against the fingerboard. Fingernail pizzicato is indicated by a ⌒, and is achieved by pulling the string with the fingernail. Once again, the sign must be placed above each note that is to be snapped. The *pizz.* is not necessary for either the fingernail or the snap pizzicato, since the mode of playing is implicit in the sign.

Example II–58. Bartók, *String Quartet No. 4*, fourth movement, mm. 56–64



Arpeggiated Pizzicatos

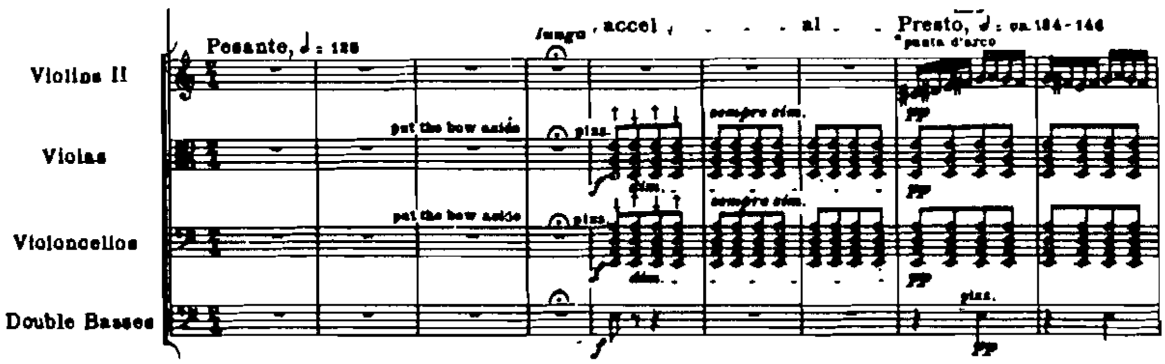
When no preference is expressed by the composer, the performer will pluck a chord of three or four notes from the bottom up, and the arpeggiated effect can be held to a minimum by incisive, sudden finger strokes. In some cases, *non arpegg.* is specified. Otherwise, the arpeggiated pizzicato is performed:

Example II–59



Sometimes the composer wants the chord played the other way around, or in the case of a repeated chord, alternating between bottom to top, then top to bottom. In these cases, a directional sign ↑ ↓ should be placed in front of each chord. Occasionally, the phrase *quasi chitarra* or *a la chitarra* is printed in the part and score, or arrows are placed above the chords.

Example II–60. Bartók, *Concerto for Orchestra*, fifth movement, mm. 1–9



Before leaving the subject of pizzicato, a word of caution must be added concerning endurance and speed. A long, fast pizzicato passage, played without rests, becomes very fatiguing for the performer. Some string players have perfected a technique of using the index and middle fingers alternately to facilitate a lengthy pizzicato passage. Nevertheless, occasional rests and alternation between first and second violins or violas and cellos would help alleviate any physical discomforts. Here is an example of successful lengthy pizzicato passages from the orchestral literature; notice the periodic rests in this long and very taxing pizzicato passage:

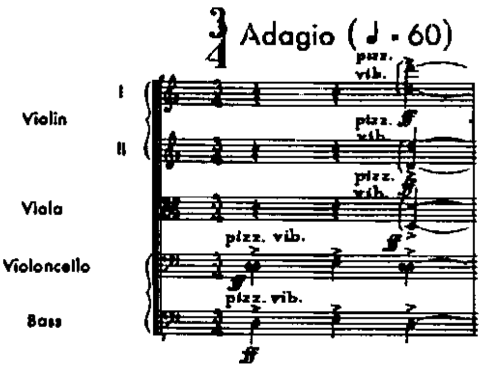
Example II–61. Tchaikovsky, *Symphony No. 4*, third movement, mm. 1–17



For additional pizzicato examples, see the pizzicato movements of Britten, *Simple Symphony*, and Foote, *Suite for Strings in E*.

Let us remember that pizzicato is similar to staccato and spiccato bowing in that the sound dies away quickly. In order to indicate that a pizzicato note is to sound as long as possible, composers sometimes write pitches with indeterminate slurs thereafter, signalling their preference for a long, "sustained" *pizz.* with the phrase "let vibrate," or *l.v.* In connection with this discussion, it is important to mention that the thickness of the string greatly affects the sustained quality of a pitch that is plucked, so that double bass strings, of course have the greatest sustaining power of all the strings of the violin family.

Example II–62. Diamond, *Symphony No. 4*, second movement, m. 1



WITH MUTE

con sordino (It.), *avec sourdine* (Fr.), *mit Dämpfer* (Ger.)

All string instruments may be muted. The designation most often used when a mute is called for is *con sordino*. At that time, the player places a small plastic, wooden, or metal object on the bridge, thus absorbing some of the vibrations, and achieving a very soft and smooth sound. The tone quality is radically altered, and while most muted passages are soft, it is also effective to write forte or fortissimo portions of a work for muted strings. The loud muted passage takes on a special quality of restraint and a constricted, more tense sound. The composer or orchestrator should listen carefully to both soft and loud muted passages in order to recognize and understand this fascinating sound.

Example II–63. Weber, Overture to *Oberon*, mm. 13–21





WITHOUT MUTE

senza sordino (It.), *sans sourdine* (Fr.), *ohne Dämpfer* (Ger.)

A special word of caution in connection with the muting and unmuting of strings. Enough time must be allowed to put on or take off the mutes. Even though some players now use clips which easily slide to the back of the bridge and clip on easily, some still use the older version, which need to be placed on the bridge, removed from it, and put away. It is necessary to allow some time for this procedure; otherwise, chaos may result.

SCORDATURA

The open string of all string instruments can be altered for certain color effects or some practical considerations. That is, each string may be tightened or loosened to produce a pitch other than the normal tuning. This is called scordatura, an Italian term meaning mistuning. The device of scordatura tuning has been used since the seventeenth century to facilitate difficult passages in remote keys, to obtain unusual chords, and to change the tone color of the instrument. When a scordatura tuning is required the composer or orchestrator must indicate the tuning of the four strings in the score either at the beginning of the piece or at the point in the work when retuning is necessary. The same information must appear in the individual parts. Plenty of time must be allowed if the player is to return to the original tuning. This is signalized by the word *accord* or *accordatura*. Here are some examples of famous scordatura passages:

Example II–64. Saint-Saëns, *Danse macabre*, tuning and mm. 25–32

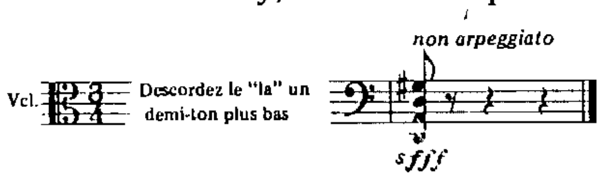


(The "0" here stands for the open string.)

Example II–65. Mahler, *Symphony No. 4*, second movement, mm. 6–17*



Example II–66. Stravinsky, *Le Sacre du printemps*, last 2 measures



In the Mahler example, scordatura is used coloristically to make the violin sound like a "cheap fiddle"; the straining of all four strings caused by raising each a whole tone removes much of the noble sound we usually associate with the instrument. Scordatura is used much more today for reasons like this. In years past, it facilitated playing in difficult keys; for example, a viola would be retuned D♭–A♭–E♭–B♭ and its part written out in D major. This may be observed in the solo viola part of the Mozart's *Symphonie concertante*, which is in the key of E♭; *scordatura* was thought to facilitate the performance. Of course there is a valid musical reason for the retuning; the increased tension on the string gives the viola much greater brilliance.

*The additional flats in the signature are necessary to place the solo violin in the key of the rest of the orchestra, since all pitches must be read a major second lower than notated.

NATURAL HARMONICS

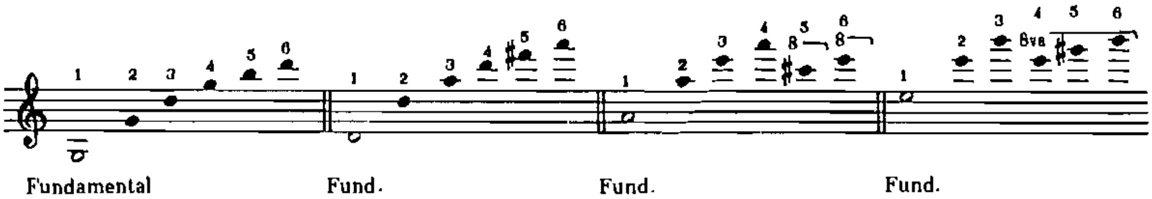
Armonici (It.), *Harmoniques* (Fr.), *Flageolettöne* or *Flageolet* (Ger.)

To this point in our discussion, we have dealt with that series of pitches which is produced either by the open string, or those sounded by fingers pressing the string tightly against the fingerboard. Two other series of notes exist and can be performed easily on all string instruments. The first series is called *natural harmonics*, which are overtones of an open string produced by touching the string lightly at various points called nodes.

Every pitch produced on a sounding body, whether a string, as in this case, or a vibrating air column, is a combination of the fundamental and overtones. These are usually heard as a single or composite tone. The overtones, which give individual color or timbre to the fundamental, can be isolated from the fundamental on a string instrument by touching the string lightly at different nodes. Therefore, when we lightly touch the A-string of a viola halfway between the nut and the bridge, we prevent the string from vibrating as a whole. The vibrating lengths are now the two halves of the string, each sounding an octave higher than the string itself (ratio 2:1). It must be noted here that in theory it does not matter whether we draw the bow on the nut or the bridge side of the node, since either half of the string will give us the higher octave result.

On the violin, these natural harmonics can be translated into musical terms thus:

Example II–67



Notice that the fundamental (marked "1") to the sixth partial are given because these are the strongest and most successfully produced harmonics, even though higher harmonics (up to the seventh or eighth partial) are quite easy to obtain on the viola, cello, and double bass, since the strings are longer and thicker.

Here is a table showing where on a given string on each string instrument the various natural harmonics can be produced:

(No. 1 is, of course, the fundamental.)

2. Lightly touching the string halfway between the nut and the bridge:

Example II–68



3. This third partial can be produced in two different ways:

a. Lightly touching the string of one-third of its length from the nut or one-third of its length from the bridge.

b. Lightly touching the string at two-thirds of its length from the nut or two-thirds of its length from the bridge.

Example II–69

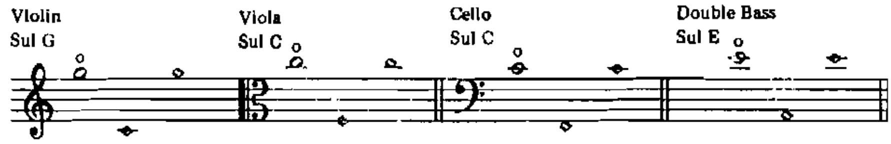


4. The fourth partial can be obtained in two different ways:

a. Lightly touching the string at one-fourth of its length from the nut or one-fourth of its length from the bridge.

b. Lightly touching the string at three-fourths of its length from the nut or three-fourths of its length from the bridge.

Example II–70



5. The fifth partial may be produced in four different ways, but only the circled ones are secure enough to be employed in orchestral use. The others are used, however, in solo and chamber music.

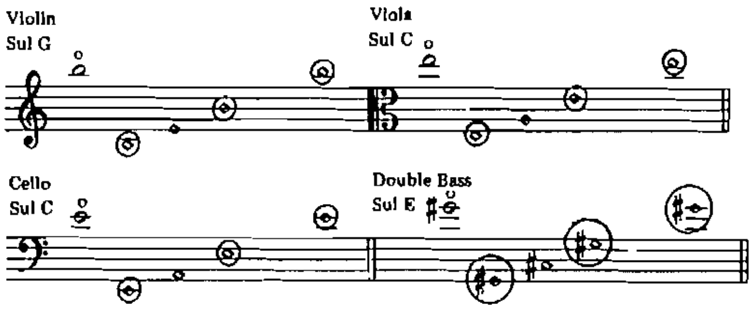
a. Lightly touching the string at one-fifth of its length from the nut (or four-fifths from the brdge).

b. Lightly touching the string at two-fifths of its length from the nut (or three-fifths from the bridge).

c. Lightly touching the string at three-fifths of its length from the nut (or two-fifths from the bridge).

d. Lightly touching the string at four-fifths of its length from the nut (or one-fifth from the bridge).

Example II–71



Notation of Natural Harmonics

1. A small circle over the note intended to sound as a harmonic; or

2. A diamond-shaped note at the pitch where the node producing the desired note may be found on the string.

Notice that in the examples given above, the string on which the various harmonics are to be reproduced is specified. That is because some pitches of the harmonic series on one string are duplicated on another. For example, on the violin, this pitch could be produced as a harmonic on the G- as well as on the D-string: 

Therefore, an indication of the string on which the pitch should be obtained must be carefully marked. If it is to be on the G-string, the term *sul* G should be used. Some like to designate the strings by roman numerals. In that case, the lowest (G) string is IV. The same holds true of all the string instruments.

Nomenclature of the Strings

Violin	*Viola*	*Cello*	*Double Bass*
I = E	I = A	I = A	I = G
II = A	II = D	II = D	II = D
III = D	III = G	III = G	III = A
IV = G	IV = C	IV = C	IV = E

Quick Reference Table of Natural String Harmonics Practical for Orchestral Scoring*

Violin



Viola



Cello



*The small notes in each case are the resultant pitches of the harmonics.

Double Bass



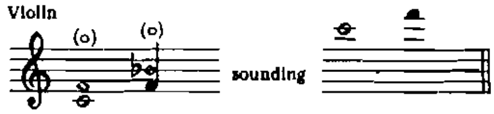
ARTIFICIAL HARMONICS

The second type of harmonics, *artificial harmonics,* produce the same flutey, silvery sound as the natural harmonics, but are manufactured rather than simply stopped on the open strings. On the violin and viola, the way to produce artificial harmonics is by stopping a pitch with the first finger and at the same time lightly touching a node a fourth above with the fourth finger. This produces a pitch two octaves above the stopped pitch. On the cello, this can be accomplished by using the thumb to stop the tone, while the node a fourth above is touched by the third or fourth finger. Double bass artificial harmonics are not recommended, even though some contemporary composers have called for them in solo music. The stretch of the hand makes it most impractical for clean performance. The node a fourth above the stopped pitch has been found to be most practical, and it is suggested that this manner of securing artificial harmonics be adopted for orchestral performance. Other artificial harmonic possibilities will be discussed in the separate chapters on the violin and viola, for they are used in solo and chamber works for those instruments.

Notation of Artificial Harmonics

1. A normal note with a diamond-shaped note one fourth above. One may or may not use the circle over the notes, although that makes it even clearer.

Example II–72



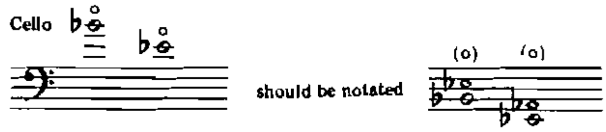
2. A normal note with a diamond-shaped note one fourth above, plus the actual intended note added above at the discretion of the orchestrator.

Example II–73



3. A small circle above the note intended to be heard as a harmonic, leaving the actual method of production to the player. This is chancy, and the orchestrator should use either of the two preceding methods instead, since the responsibility for the method of producing the harmonic should not be shifted to the performer.

Example II–74



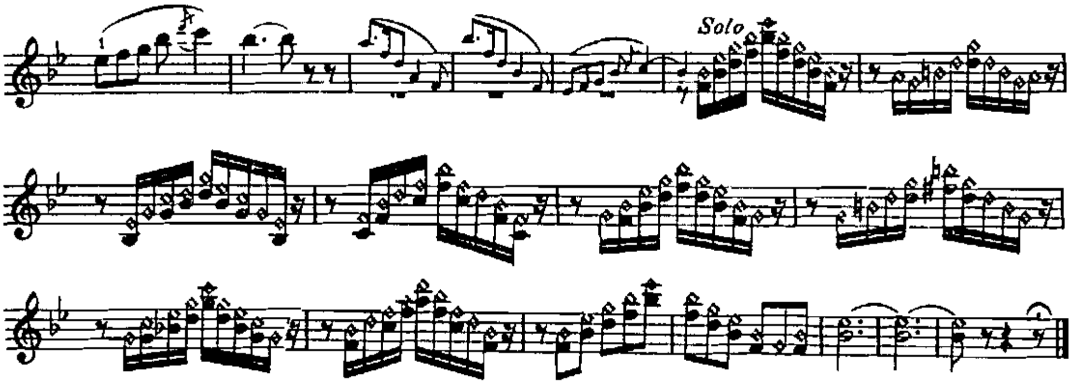
A question often asked is how high one can or should write artificial harmonics. While theoretically there is almost no limitation, practically, the following artificial harmonics should be considered a reasonable limit, especially for orchestral use, since the higher ones are insecure and would probably squeak.

Example II–75



Two extended passages with harmonics:

Example II–76. Saint-Saëns, *Violin Concerto*, second movement, last 13 measures



Example II–77. Borodin, *String Quartet No. 1*, third movement, Trio, mm. 1–20



Some examples of orchestral harmonics:

Copland, *Symphony No. 3*, p. 41 in the first violins; see also Example III–17 and III–19

Schoenberg, *Violin Concerto*, first movement, mm. 212–25 (extensive use in solo part)

Webern, *Six Pieces for Orchestra*, Op. 6, No. 5; also see Example III–18

Webern, *5 Pieces for Orchestra*, Op. 10, second movement

CONTEMPORARY STRING TECHNIQUE EXTENSIONS

During the past thirty years, a great number of innovations and extensions of string techniques have been added to our vocabulary. There are so many modifications, in fact, that it has taken entire volumes to discuss these newer techniques adequately. Therefore, it is only possible to mention some of the most important of them and to codify those that are most commonly used in terms of notation. The student's attention is called to such books as David H. Cope's *New Directions in Music* (Wm. C. Brown), Gardner Read's *Contemporary Instrumental Techniques* (Schirmer Books), and Kurt Stone's *Music Notation in the 20th Century* (W. W. Norton) for a more complete and detailed discussion of some of those techniques.

Here, then, are some important contemporary string technique innovations:

a. Playing on the "wrong" (that is, the tailpiece, not the fingerboard) side of the bridge

1. play all four strings behind the bridge
2. three strings
3. two strings
4. one string only

One can also play *col legno* behind the bridge

b. Playing the tailpiece with the bow-hair or striking it with the wood of the bow . (If the performer is to strike the tailpiece with the wood of the bow, the word *battute* should precede the passage.)

c. Knocking, rapping, or tapping on the body of the instrument either with one's fingers or knuckles. This is usually requested in a footnote and further explained. Usual notation: 

d. Wide vibratos, as represented in the notation: 

e. Bowing on a harmonic node with great pressure in order to produce notes well below the open string of the instrument (subharmonics or undertones).

f.  = playing, in any mode specified, the highest note on a particular string 

(here on the G-string), or if the sign is used without designating a string, simply playing the highest note on the instrument.

g. A composer may ask for a passage to be fingered without the bow being drawn across the strings. This gives a quiet, ghostly sound, and the pitches are almost inaudible, yet make a slight sound as the fingers are slapped down hard on the strings.

h. Pizzicatos with plectrums or combs have become quite popular.

i. Half-harmonics—either touching the string lightly but not at a harmonic node, or touching the string a little more firmly than usual at a harmonic node. This effect is somewhat related to the sound of *sul tasto*.

Many harmonics which have been thought to be unplayable on the double bass heretofore are now being performed in solo and chamber music literature, but as yet would be dangerous to use in orchestral writing.

j. George Crumb, and others, ask for players to bow near the nut rather than the bridge "on the wrong side of the left hand," in order to produce a "viol-like" sound. The fingering, of course, would be reversed; he even asks that the beginning pitch be marked on the finger board with a chalk mark. This effect is required in Crumb's *Black Angels*, a work for amplified string quartet. It should not be casually used in orchestral works, at least right now, because few players would be able to produce it.

If any of the devices mentioned above are to be used in an orchestral score or, for that matter, anywhere in any kind of a work whether solo, chamber, or orchestral, it is strongly urged that a verbal description of the sounds the composer desires, as well as the exact technique by which the sounds may be realized, be included in the score, since the notation varies so greatly from one composer to another. In the interest of maximum communication between composer and performer, it is urged that the procedures outlined in the book by Kurt Stone mentioned above be adopted. The few notational signs given above are those most commonly used for the described effects.*

*For an excellent example of practical notation guidance to a contemporary work, see Example V–31 on p. 140.

3

Individual Bowed String Instruments

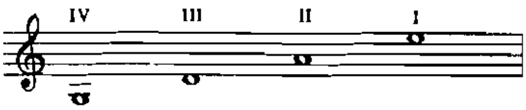
VIOLIN

Violino (It.), *Violon* (Fr.), *Violine* or *Geige* (Ger.)



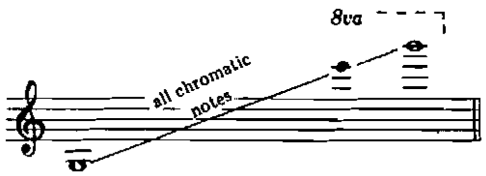
Zvi Zeitlin, violin

Example III–1. Tuning



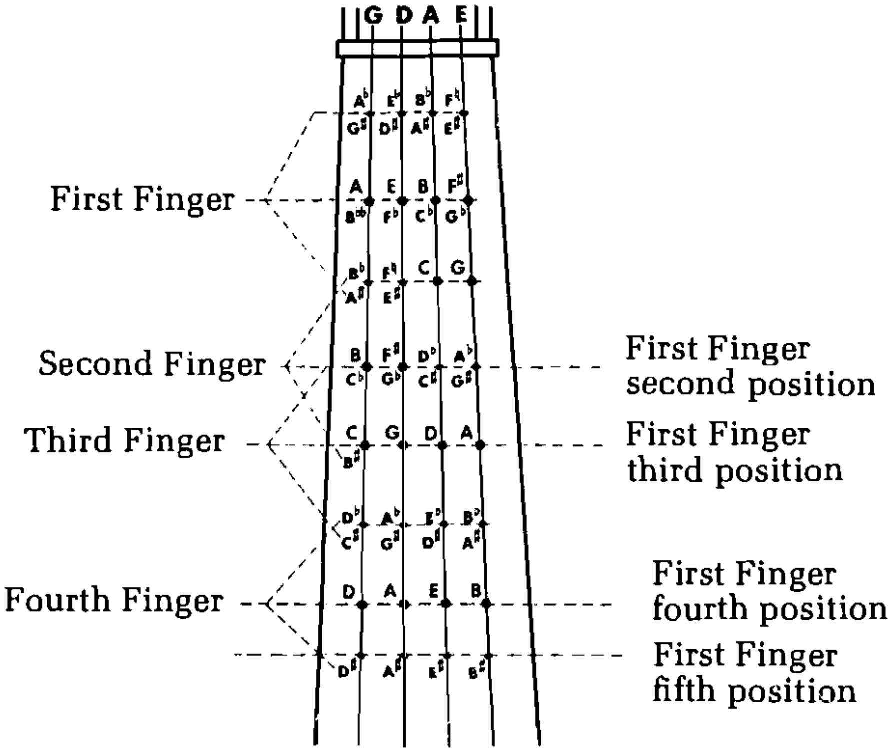
All music for the violin is written in the treble clef.

Example III–2. Range



The violin is the soprano instrument of the string section. It is held on the left shoulder, supported by the left side of the chin, and held from underneath by the left arm and hand at the instrument's neck. All techniques and color effects previously discussed in the comprehensive string chapter are within the scope of this most versatile instrument. Now we will explore some particular problems, possibilities, and special properties of the violin in order to facilitate its most effective use.

The practical orchestral range of the violin extends from the low string G to the high E  but in solo or chamber music playing, the B above or even higher is possible. In the discussions of the individual string instruments, it must be kept in mind that the extremely high range is difficult to control, and only in the past 150 years has it been used extensively. During the Classical period, the limit of the violin range was . Beyond the seventh position, in which that A is the highest note, the spaces between the fingers become progressively smaller; left-hand control is more and more tenuous as the thumb, which acts as a stabilizing lever on the neck and then the body of the instrument, loses its hold; the hand must therefore seek the higher notes without the orientation of the thumb's position. Here is a reminder of the fingering for the violin and the first five positions:



Example III–3



Notice that from the open G to the C♯ and from the high B up, the pitches are available on one string only. The D  for instance, can be played on the open string or with the fourth finger on the G-string in first position. It can also be performed with the third finger on the G-string in second position, the second finger on the G-string in third position, or the first finger on the G-string in fourth position. It would be futile, then, to specify where the violinist is to play a particular pitch, which is duplicated in many places on the instrument. If the composer or orchestrator has great insight into the fingering of the instrument, the desired timbre should be the only justification for putting fingerings in the score or parts. Except under special circumstances, then, the actual fingering is best left to the performer.

Let us examine what is meant by timbral considerations. The open strings have a distinctive sound of their own. In a fast passage this may not make any difference, but in slow, expressive passages, one usually wants all the tones to be of equal and controlled texture. The open strings have a greater vibrating potential, but are not under the controlling influence provided by the finger which oscillates a

stopped note. In other words, the open string on all string instruments has a characteristic sound which lends itself to great exploitation separately but stands out peculiarly in other situations. Of course, the open G-string is unavoidable, since it cannot be duplicated on the instrument; notice, for instance, how its vibrant singularity can be felt in this passage.

Example III–4. Brahms, *Symphony No. 1*, fourth movement, mm. 61–78



How different this open note sounds from all the stopped notes.

This brings us to the important but controversial subject of the particular properties and qualities of each of the four strings of the violin. It is virtually impossible to explain verbally the many shades of sound that the violin can produce. It is far more effective to illustrate the almost unlimited range of sounds that can be produced throughout the entire range of the violin with examples from the literature.

The G-string

This is the thickest and most sonorous of the four strings. As one goes into its higher positions, the sound becomes very intense and stringent because the vibrating portion of the string is constantly being shortened.

Example III–5. Tchaikovsky, *Symphony No. 5*, second movement, mm. 111–19



See also Mahler, *Symphony No. 3*, first movement, mm. 5–8.

The D-string

This is possibly the least powerful of the four. However, it has a warm and rather subdued quality, especially in contrast with the G-string. It mellows even more in its higher positions as its vibrating length is shortened.

Example III–6. Rimsky-Korsakov, *Scheherazade,* third movement, mm. 1–8



The A-string

This is quite strong in first position, but loses some of its brilliance in the upper positions. In soft, lyrical, expressive passages, the composer will often prefer the higher pitches to be performed on the A-string rather than have the player cross to the E-string, where these upper notes take on a different, more brilliant timbre.

Example III–7. Brahms, *Symphony No. 3,* third movement, mm. 13–24



The E-string

This is the most brilliant of the four strings. It has tremendous carrying power and is quite forceful, even strident, in the higher positions. At the same time, one can elicit the most ethereal sounds, which are clear and luminous when one plays softly on the E string.

Example III–8. Strauss, *Don Juan,* mm. 9–16





See also Prokofiev, *Classical Symphony*, second movement, mm. 1–4.

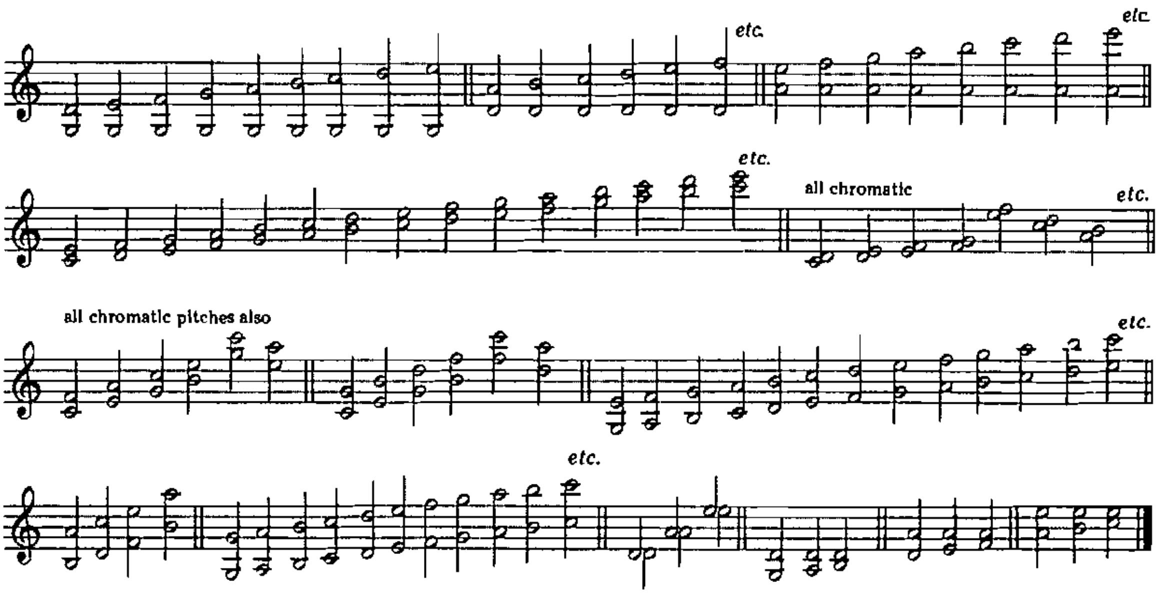
If one wishes to have a passage performed on one string exclusively, the passage should be marked *sul E*, *sul A*, *sul D*, or *sul G*. (The French prefer using roman numerals, as was mentioned in the previous chapter.)

Double-stops

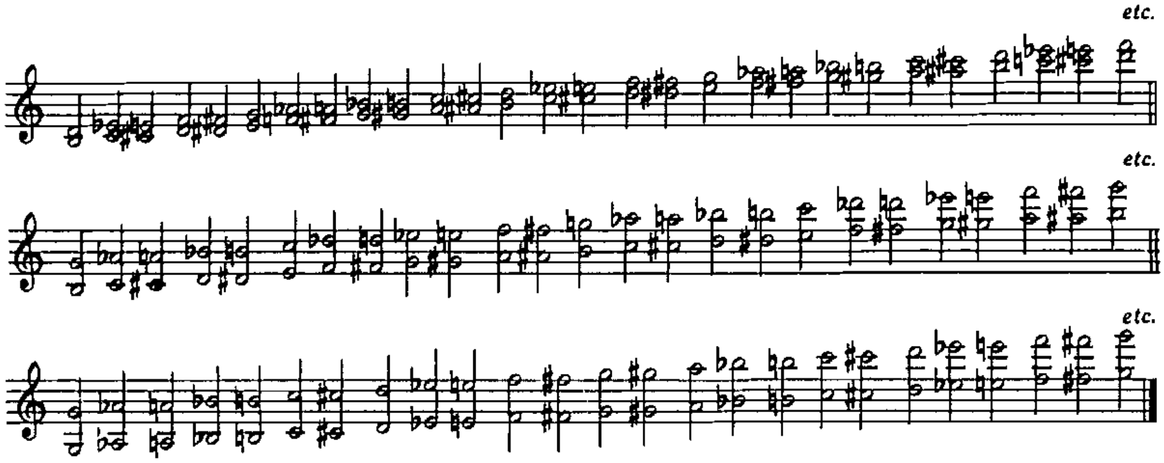
The double-stop technique has already been discussed in general terms for all string instruments. Focusing specifically on double-, triple-, and quadruple-stopping for the violin, it is important to emphasize once again that most difficult double-stopping is reserved for solo and possibly chamber music. In orchestral writing, only the most easily accessible double-stops are usually used, particularly for *secco* chordal effects or especially sonorous passages. Since there are at least sixteen first violins and fourteen second violins in the two sections of a conventional symphony orchestra, passages that would be quite difficult for one performer are quite simple played *divisi*.

Here is a partial list of the double-, triple-, and quadruple-stop possibilities on the violin:

Example III–9. Double-stops



Example III–10. Chromatic Double-stops



Example III–11. Triple-stops*



Example III–12. Quadruple-stops



*Don't forget that all string triple- and quadruple-stops are of necessity played rolled.

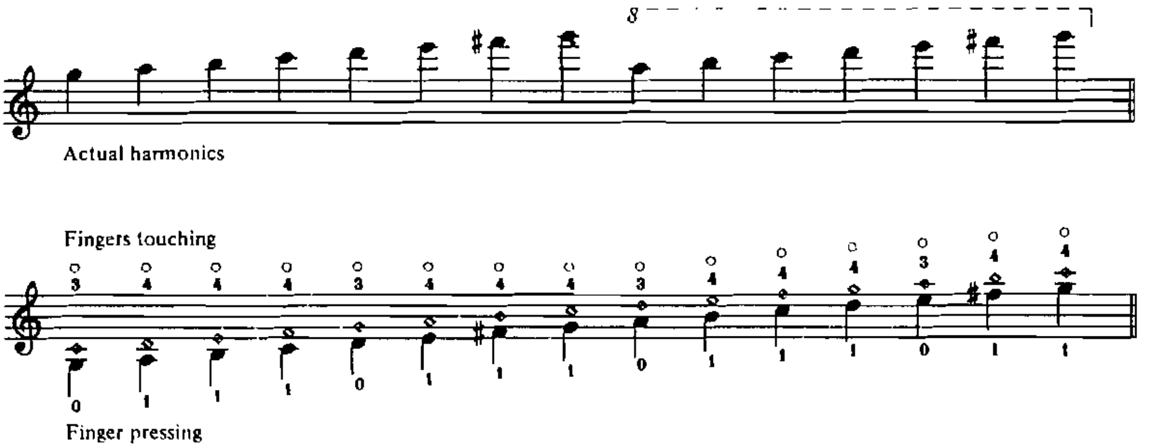


Harmonics

Both natural and artificial harmonics have already been discussed; however, in solo and some violin chamber music, composers have required the violinist to produce harmonics in other ways than has been demonstrated

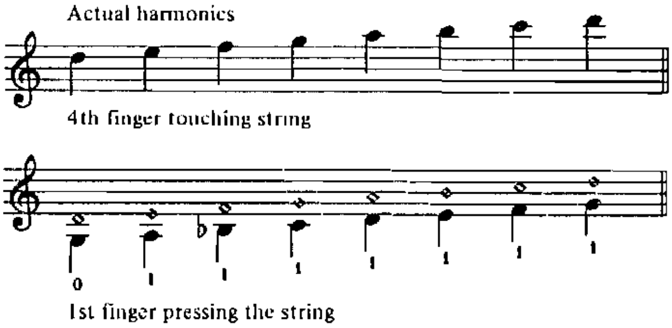
1. The most practical harmonics for orchestral writing are the "touch fourth" harmonics.

Example III–13



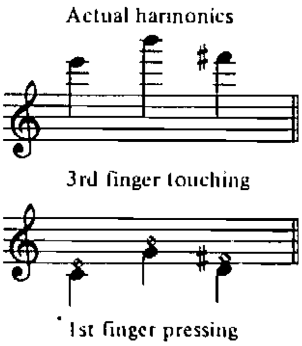
2. The "touch fifth" harmonics produce a tone which is one octave above the note that is lightly touched.

Example III–14



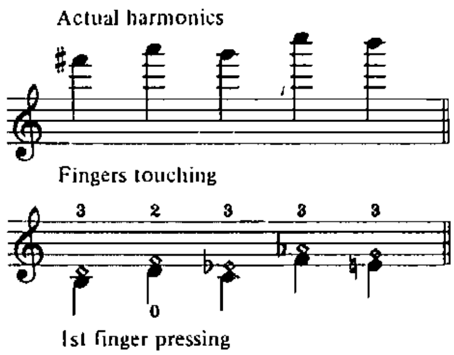
3. The "touch major third" harmonics produce a pitch two octaves above the lightly touched note.

Example III–15



4. The "touch minor third" harmonics produce a pitch two octaves and a major third (17th) above the lightly touched note.

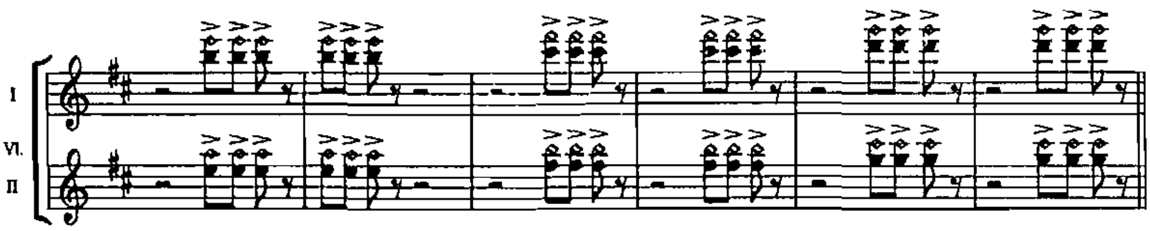
Example III–16



Because Nos. 2, 3, and 4 are difficult to produce, all orchestral harmonics should be played as described in No. 1. The "touch thirds" harmonics, both major and minor, are especially weak and extremely risky.

Here are some successful orchestral passages using violin harmonics:

Example III–17. Copland, *Symphony No. 3*, fourth movement, mm. 3–8 after 128



Example III–18. Webern, *Six Pieces for Orchestra*, Op. 6, No. 5, mm. 20–26 (Strings only)



Example III–19. Stravinsky, *Le Sacre du printemps*, 101



The Solo Violin

The violin has long been a favorite solo instrument of many composers. Almost every great master of orchestral music since the Baroque period has written violin concertos exploiting the tremendous range, versatility, and expressiveness of the instrument. Everyone should become acquainted with the masterpieces in this genre by such composers as Bach, Mozart, Beethoven, Mendelssohn, Brahms, Dvořák, Tchaikovsky, Bruch, Lalo, Schoenberg, Berg, Bartók, Prokofiev, Penderecki, and Rochberg, to name only a few. However, the special quality of the violin has also been greatly exploited as an occasional solo instrument in the orchestra. When one solo violin is called for, the concertmaster will play the part. When two soloists are required, the first stand of the first violins will be called upon. If the composer wishes some special effect, he may write one solo part for the first violin and another for the second violin. In that instance, the concertmaster and the principal second violinist will play. Some of the solo parts in the orchestral literature are quite virtuosic; therefore, today, the principal players of all sections must be of solo caliber.

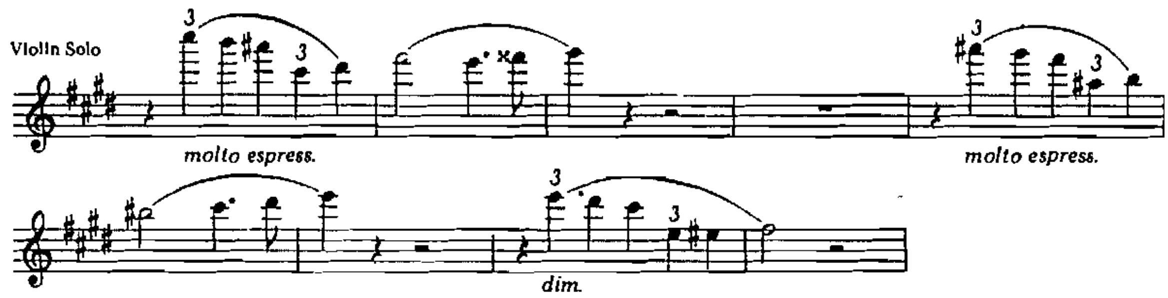
Some examples of solo violin passages from orchestral works:

Example III–20. Brahms, *Symphony No. 1*, second movement, mm. 91–105





Example III–21. Strauss, *Don Juan*, mm. 73–82



Other Technical Considerations

SKIPS

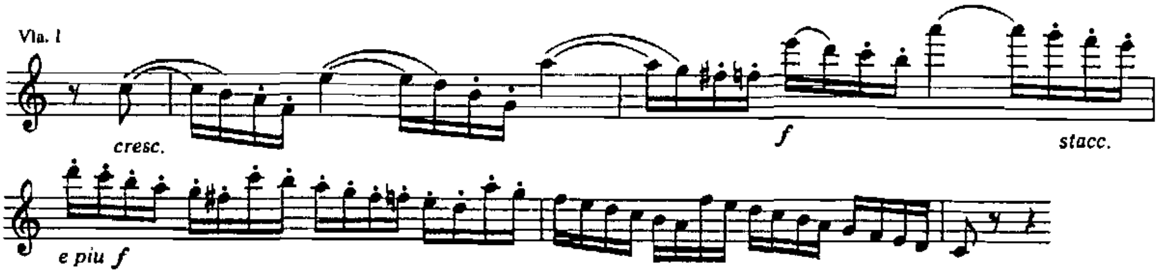
Even though the violin is a most versatile and agile instrument, the problem of fast, wide skips presents real difficulties. They can sound thrilling, especially if the skips are from the extreme low register to the extreme high register. But one must realize that a soloist can execute this shift more accurately than a whole section. The difficulty is, of course, that the entire left-hand position has to be completely altered; sometimes strings have to be crossed silently yet smoothly; or a very high note must follow an extremely low one on the same string. Most skillful players can give a fairly good impres-

sion of legato playing, even when there is a string intervening in the skip, but there are difficulties in simply hitting the correct pitch.

In the following passages from orchestral violin parts, some of these difficulties are demonstrated. (Note that recordings are misleading, since in case the section does not clearly articulate the skip, the passage can be retaped until it is perfect.) These are problematical passages:

1. Wide skips on the same string:

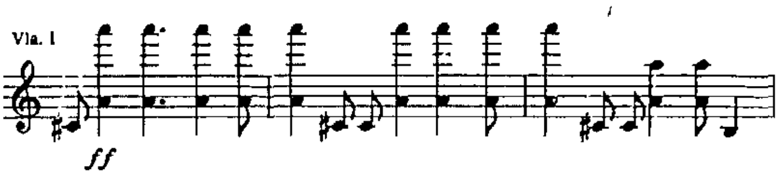
Example III–22. Wagner, Prelude to *Die Meistersinger*, mm. 33–38



See also Shostakovich, *Symphony No. 5*, first movement, mm. 51–62.

2. Wide skips between extreme ranges:

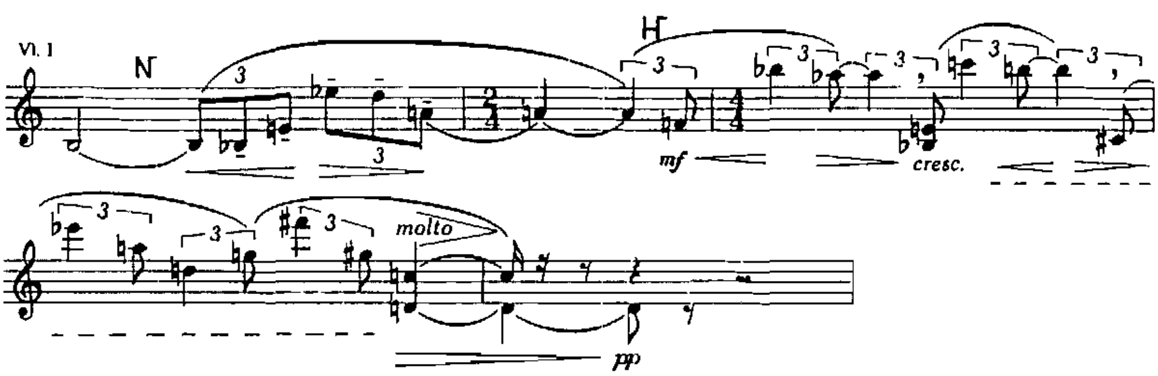
Example III–23. Bartók, *Divertimento*, first movement, mm. 50–52



See also Copland, *Symphony No. 3*, fourth movement, mm. 2–4 after [96].

3. Wide skips legato:

Example III–24. Berg, *Lyric Suite*, fourth movement, mm. 10–14

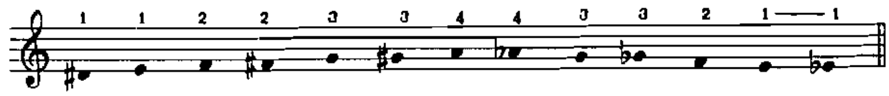


See also Stravinsky, *Agon*, Pas de deux, mm. 411–18.

CHROMATIC PASSAGES

This is a fingering problem, but should be mentioned here. All chromatic notes from the G-string to the highest register can be produced easily on the violin. Usually, the finger that is to play a pitch plays the chromatic step most closely related to it:

Example III–25



There are instances when the performer chooses not to risk the portamento that is inevitable if the chromatic scale is performed as in Example III–25. Therefore, the scale is played in "half position."

Example III–26



This is most appropriate in fast passages, for it minimizes the audible shifting of the same finger.

VIOLA

Viola (It.), *Alto* (Fr.), *Bratsche* (Ger.)



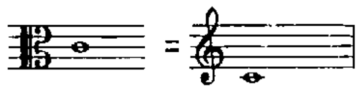
George Taylor, viola

Example III–27. Tuning

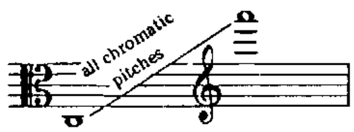


Viola music is usually notated in the alto clef, but to avoid ledger lines, the upper notes are sometimes written in treble clef.

Example III–28



Example III–29. Range



The viola is the alto voice of the string orchestra and its playing technique is similar to that of the violin. There are some problems to be kept in mind when writing for viola. The most obvious is the size of the instrument. It is quite a bit larger, sometimes as much as three to four inches, than the violin, and this means that the hand must stretch more to get the intervals in tune. The tension on the left hand is also greater, especially in the higher positions. There are variations in the size of violas, and experts do not agree on the ideal size for the most beautiful, characteristically dark-hued tone quality. Today, violists pick their instrument in proportion to the size of their left hand.

Of all the bowed strings, the viola has been the slowest to emerge. Even though trills, bowings, harmonics, arpeggios, double-, triple-, and quadruple-stops are just as successful on the viola as on the violin, this instrument has been undeservedly neglected by many great masters of the past. There are perhaps two principle reasons:

1. The eighteenth-century masters rarely wrote for four independent string voices.

2. For a long time, most violists were converted violinists and did not always enjoy the full trust of composers.

Although Bach, Stamitz, and Mozart wrote occasional solo or concertante works for the viola, it was not until Berlioz that it achieved a truly independent voice in orchestral writing.

Let us observe some differences between the viola and the violin which should help to define its function in the orchestra.

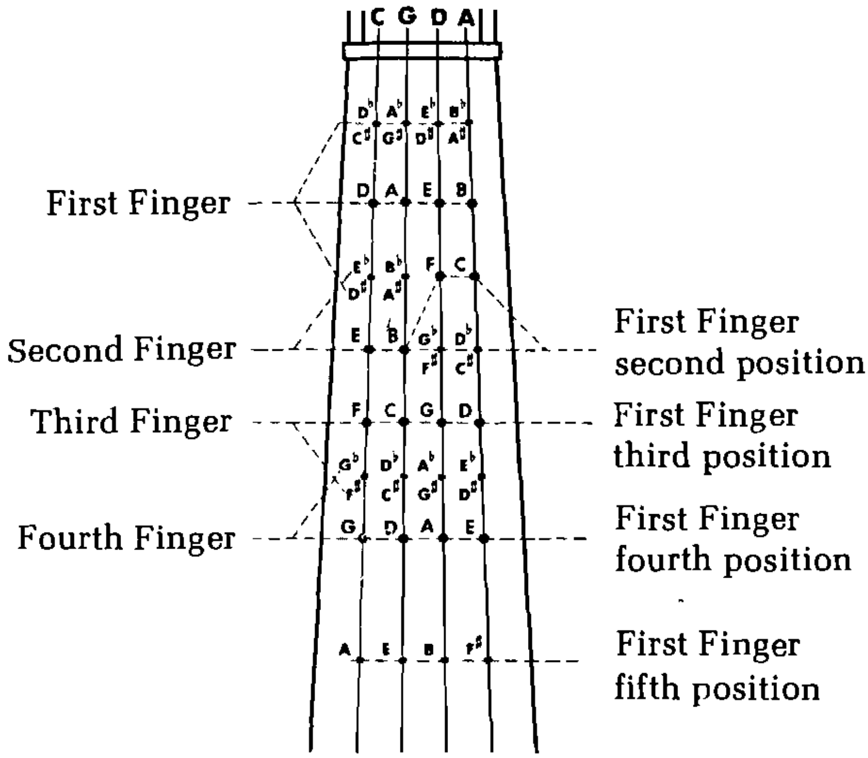
1. The viola bow is slightly heavier and thicker.

2. The strings are also heavier; therefore, they speak a bit more reluctantly and require that the player "dig in" a bit to make them sound. Hence, the lighter bowings are more difficult to produce.

3. Harmonics are easier to play because the thicker strings produce them more reliably.

Fingering

The fingering system is identical to that of the violin, and the same multiple-stop patterns are available on the viola, but a fifth lower. Similarly, all the ideas already discussed about half-positions, chromatic fingerings, pizzicato, and other color effects apply equally to this alto instrument of the violin family.



Examples of the special sound of each of the four viola strings:

The C-string

The only string not found on the violin, it is, therefore, the most characteristic of the four. It has been described by the Belgian musicologist-composer François Gevaert as "somber, austere, and sometimes even forbidding."

Example III–30. Hindemith, *Sonata*, Op. 11, No. 4, first movement, mm. 15–16



The G- and D-strings

The least characteristic, these may be called the "accompaniment strings," because it is on these that the violist performs the many accompanying figures composers have traditionally given his instrument. But they can also be exploited for their dark quality, as in the following solo:

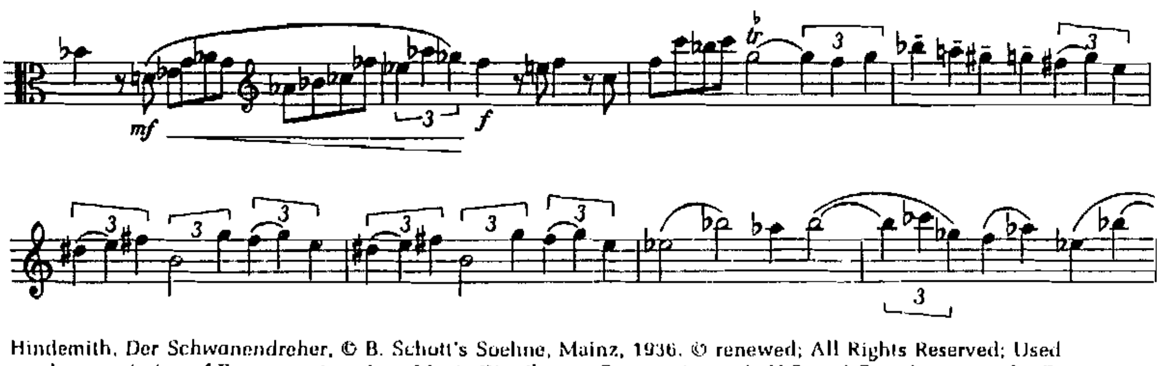
Example III–31. Bartók, *Concerto for Orchestra*, fourth movement, mm. 42–51



The A-string

While not as brilliant as the E-string on the violin, the A-string is, nevertheless, quite piercing and nasal in quality. It combines beautifully with woodwind instruments and, in some cases, doubles well with soft trumpets and trombones. Because of its carrying power, it has been used a great deal in solo viola passages.

Example III–32. Hindemith, *Der Schwanendreher*, first movement, mm. 48–58

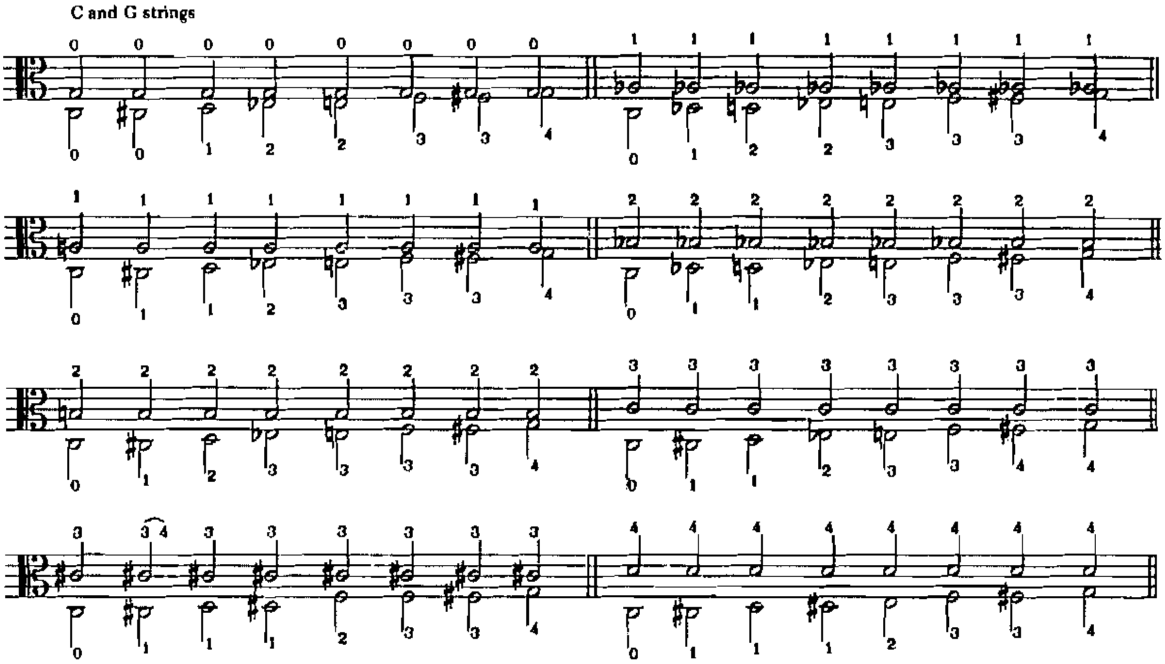




Double-stops

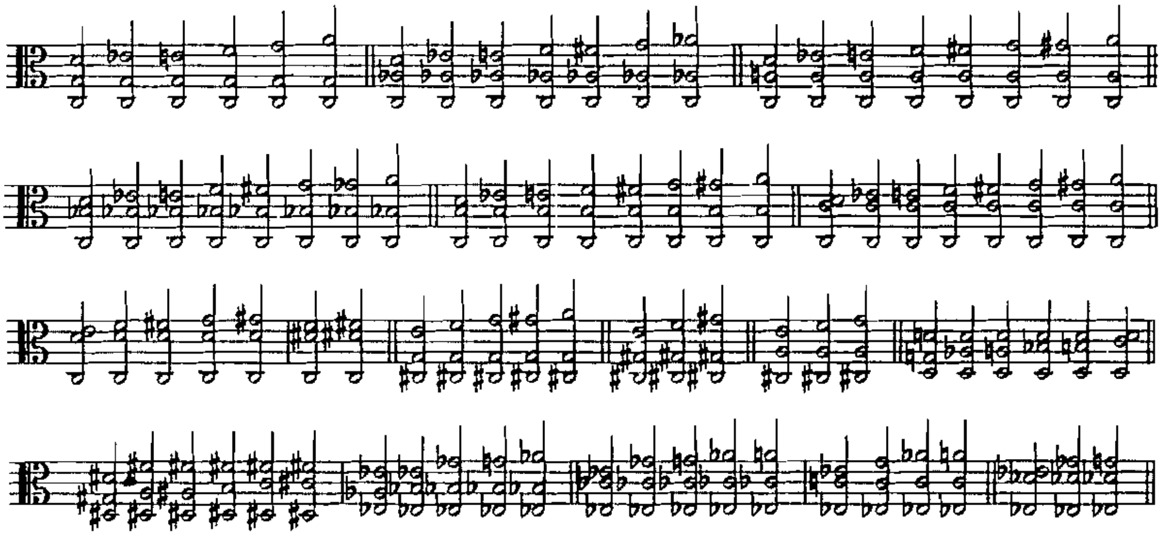
Here is a partial list of double-, triple-, and quadruple-stops which are possible on the viola. The *divisi* practice is the same as for the violin.

Example III–33. Double-stops



Tables of the double-stops on the G- and D-strings, as well as on the D- and A-strings, can be similarly constructed.

Example III–34. Triple-stops





The triple-stops on the G-, D-, and A-strings should be tabulated in the same manner as those on the C, G-, and D-strings. These triple-stops are all in the first position and are not difficult to perform, as all the awkward stops have been omitted.

Example III–35. Quadruple-stops.



Here are some characteristic viola passages illustrating the sound of harmonics, pizzicato, double-stops, and other coloristic effects on the viola. Further, there is a passage that demonstrates the use of the viola as the bass of the string section (Example III–36), and one that is typical of the many filler or harmonic "fleshing-out" places so common in the orchestral literature (Example III–37). It would be remiss not to include one example that couples the violins and the viola in octaves (Example III–38) and one that presents the very successful coupling of violas and cellos (Example III–39).

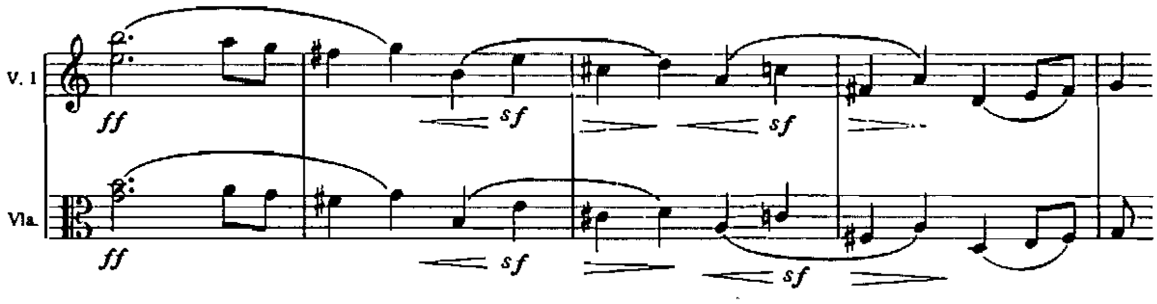
Example III–36. Mendelssohn, Overture to *A Midsummer Night's Dream*, mm. 45–49



Example III–37. Wagner, *Lohengrin*, Act III, "In fernen Land," mm. 12–19



Example III–38. Berlioz, *Symphonie fantastique*, first movement, mm. 155–59



Example III–39. Beethoven, *Symphony No. 5*, second movement, mm. 1–10



See also:

> Stravinsky, *Le Sacre du printemps*, mm. 46–47
> Hindemith, *Der Schwanendreher*, first movement, mm. 1–11
> Tchaikovsky, *Romeo and Juliet*, mm. 114–16

The Solo Viola

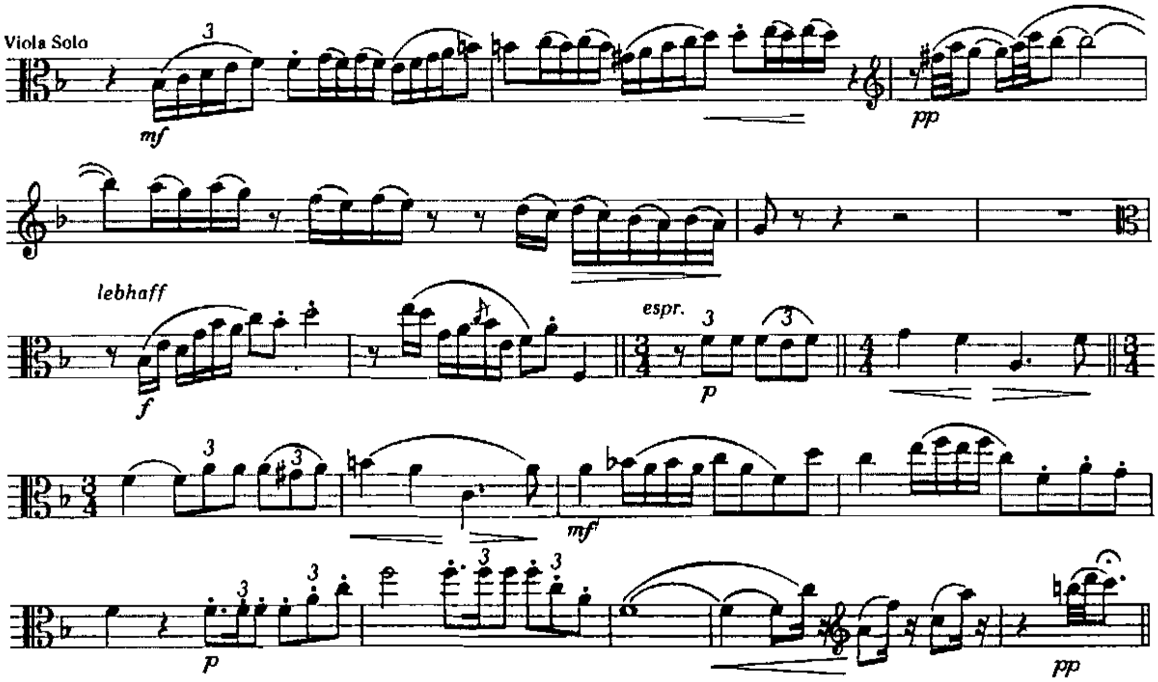
The Baroque masters wrote many concertos for the viola, and some pre-Classical composers followed their lead. However, after that period, except for the *Symphonie concertante* of Mozart for violin and viola, and the solo part in Berlioz's *Harold in Italy*, there is little significant solo viola music until Wagner and Strauss in the late nineteenth century. In the twentieth century, however, the viola has finally achieved an almost equal status with its relatives in the bowed string group. We could cite as proof works like Debussy's *Sonata for Flute, Viola, and Harp*, Bartók's and Walton's viola concertos, *Der Schwanendreher* by Hindemith, and *Flos Campi* by Vaughan Wil-

liams, to name only a few. Some wonderful examples of solo or concertante viola passages from the orchestra literature:

Example III–40. Scriabin, *Poem of Ecstasy*, mm. 22–25



Example III–41. Strauss, *Don Quixote*, Variation 2, Vivace, mm. 1–19



Example III–42. Stravinsky, *Le Sacre du printemps*, "Cercles mystérieux des adolescentes," [91]



See also Berlioz, *Harold in Italy*, first movement, mm. 38–68.

VIOLA D'AMORE

Viole d'amour (Fr.), *Liebesgeige* (Ger.)

Example III–43. Usual Tuning



The principle on which the characteristic sound of this instrument is based is sympathetic vibration. Besides the seven strings which are bowed and fingered, there are seven sympathetic strings made of steel wire, which lie just above the belly of the instrument and directly below the string with which they sympathize. The sympathetic strings are generally tuned in unison with the bowed strings.

In order to allow the characteristic sound of these sympathetic strings to be heard freely in keys other than D major, alternative tunings have been used. The most common alteration is to lower the F♯ string to F♮, thus producing a D-minor tuning.

Example III–44



Hindemith used two different tunings in his works for viola d'amore:

Example III–45. *Sonata for Viola d'amore and Piano*, Op. 25, No. 4



Example III–46. *Kammermusik No. 6 for Viola d'amore and Orchestra*, Op. 46, No. 1



Vivaldi used the following tunings (six-string instruments) in his concertos:

Example III–47



Viola d'amore music is written today in the alto and treble clefs. In the past, music for the lower strings of the instrument was often notated in the bass clef, sounding an octave higher, but this is no longer done.

Example III–48. Range

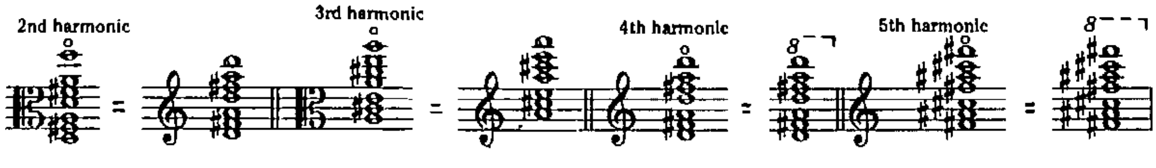


In many orchestration books, instruments infrequently used in the orchestra are labeled "ancient" or "exotic" and are treated very summarily. This has proven to be rather shortsighted, since many of these instruments are today awakening from their hibernation and enjoying a renaissance. Such an instrument is the viola d'amore. It has never been a regular member of the orchestra; it has been used primarily for solo or concertante passages in such works as Bach's *St. John Passion*, several Bach cantatas, Meyerbeer's *Les Huguenots*, Massenet's *Le Jongleur de Notre Dame*, Pfitzner's *Palestrina*, and Loeffler's *La Mort de Tintagiles*. One viola d'amore accompanies the women's offstage chorus in Puccini's *Madama Butterfly*. It is doubtful that this instrument will ever enter the modern orchestra, yet every composer and orchestrator should know at least something about it.

The instrument is slightly larger than the modern violin. Some salient features of the instrument:

1. The ability to play chords and arpeggios easily, especially in keys related to the tuning used.
2. The ability to perform natural harmonics. Easily obtained are the second, third, fourth, and fifth harmonics by touching the strings lightly where one would ordinarily stop the octave, the fifth, the fourth, and the major third. Here are the resulting sounds of the harmonics in the usual D-major tuning:

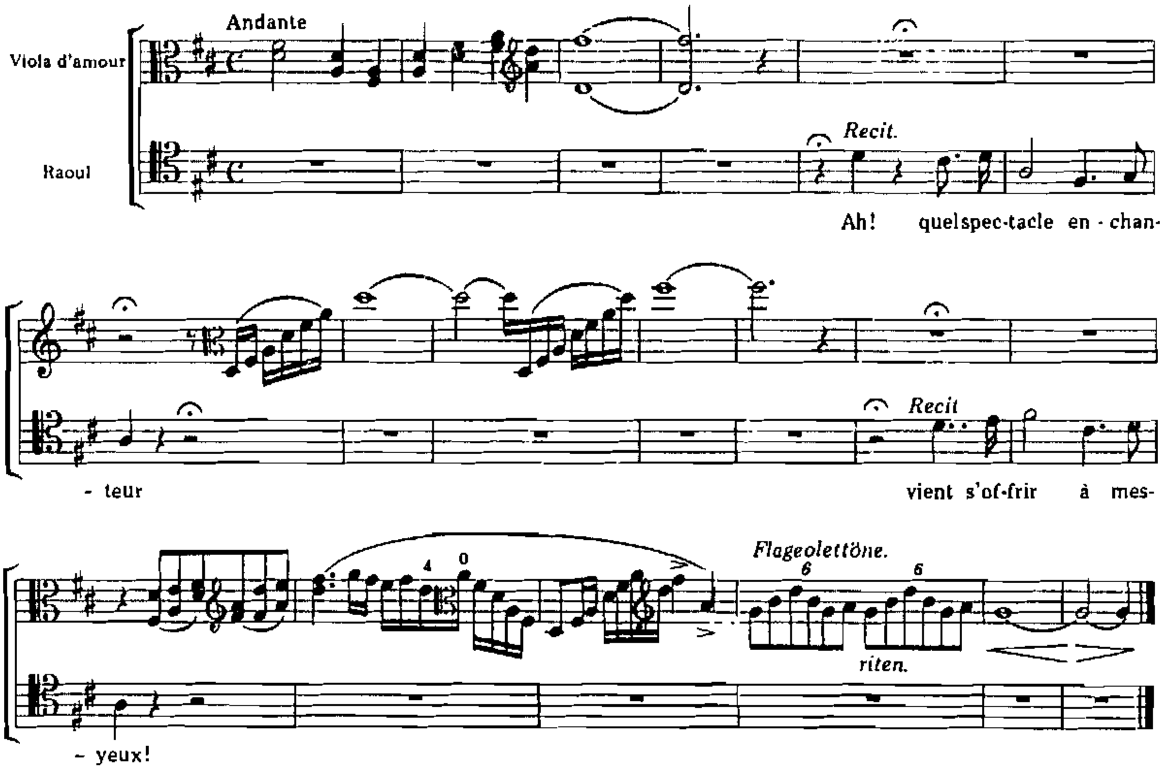
Example III–49



Artificial harmonics are, of course, also possible. The most successful are the ones produced by the "touch fourth" method. All other violin techniques of fingering, bowing, and all coloristic effects may also be achieved on the viola d'amore.

Here are two passages for viola d'amore from the literature:

Example III–50. Meyerbeer, *Les Huguenots*, Act I, "Ah quel Spectacle," mm. 1–19



Example III–51. Hindemith, *Kleine Sonate*, second movement, mm. 14–43



See also Bach, *St. John Passion*, "Erwäge, erwäge," mm. 1–5.

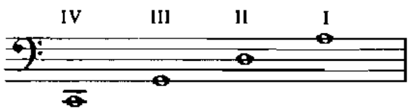
VIOLONCELLO OR CELLO

Violoncello (It.), *Violoncelle* (Fr.), *Violoncell* (Ger.)



Robert Sylvester, cello

Example III–52. Tuning



All music for the cello is written in either the bass, tenor, or treble clef. Suggested clef changes because of ledger-line considerations:

Example III–53



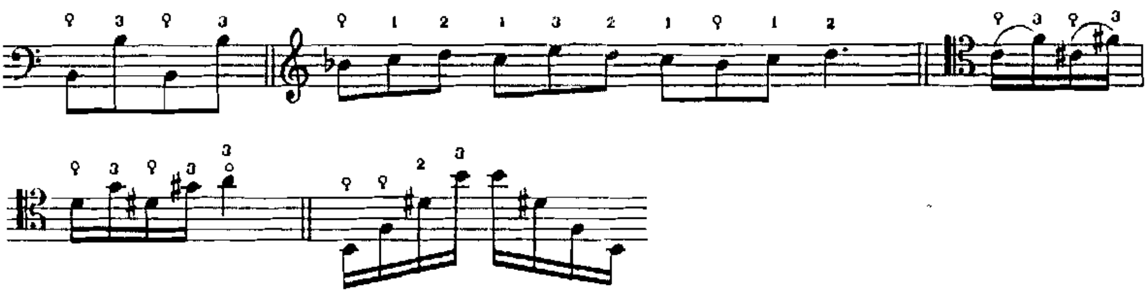
A warning to score readers: today, all cello parts, whether notated in the bass, tenor, or treble clef, sound as written. In some older editions still reprinted today, cello parts notated in the treble clef were meant to sound an octave lower than written.

Example III–54. Range

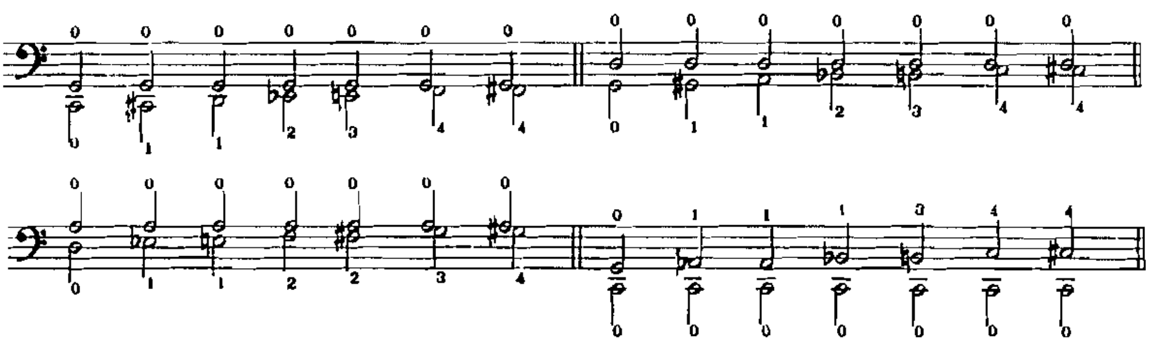


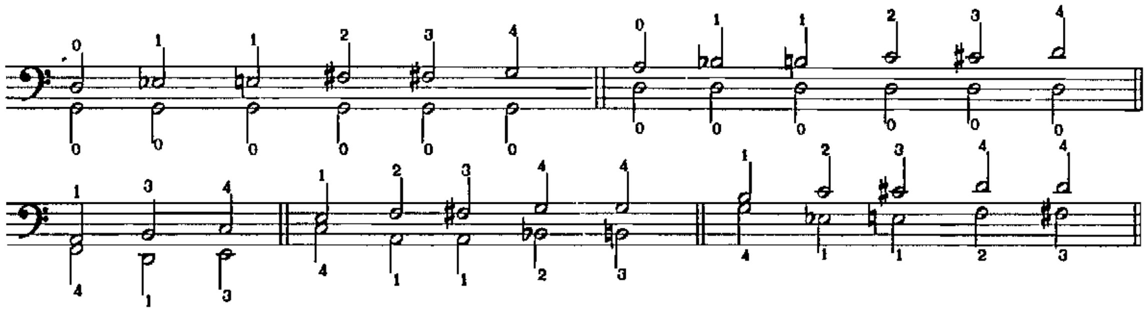
The cello is both the tenor and the bass of the string section. The violin, viola, and viola d'amore are all held on the left shoulder and supported by the chin, but the cello's playing position is quite different. The instrument is placed between the player's knees and supported on the floor by means of an adjustable peg which slides out of the bottom just below the end of the tailpiece. The neck points over the player's left shoulder. Because of the greater length of the strings, a slightly different fingering system is used to produce all the pitches on the instrument. The second finger is only used for chromatic intervals. The normal compass in the first position between the first and the fourth fingers is a third. In the upper positions all four fingers are used more often, similar to the fingering on the viola. Because the cellist's left hand is freed from the burden of supporting the instrument to a much greater degree than that of the violinist or violist, the thumb can be used in higher positions. In the seventh position of the instrument, the left-hand thumb is forced to leave its position around the neck. It is, therefore, available to be used in actually fingering the instrument. Remember, the distance between the intervals diminishes as the hand moves to higher positions. With the additional use of the thumb, then, the cellist can stretch to octave double-stops on adjacent strings with relative ease, while anything larger than sixth double-stops is difficult in the low register. The sign for the use of the thumb is ♀.

Example III–55



Example III–56. Double-stops

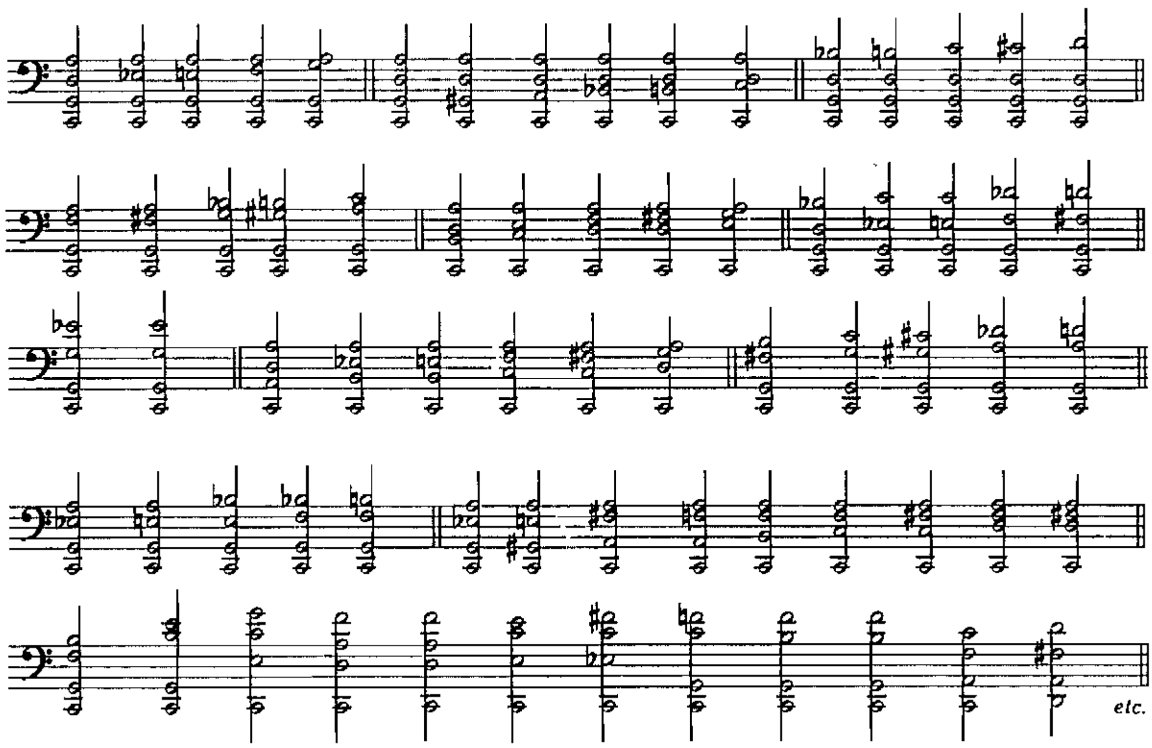




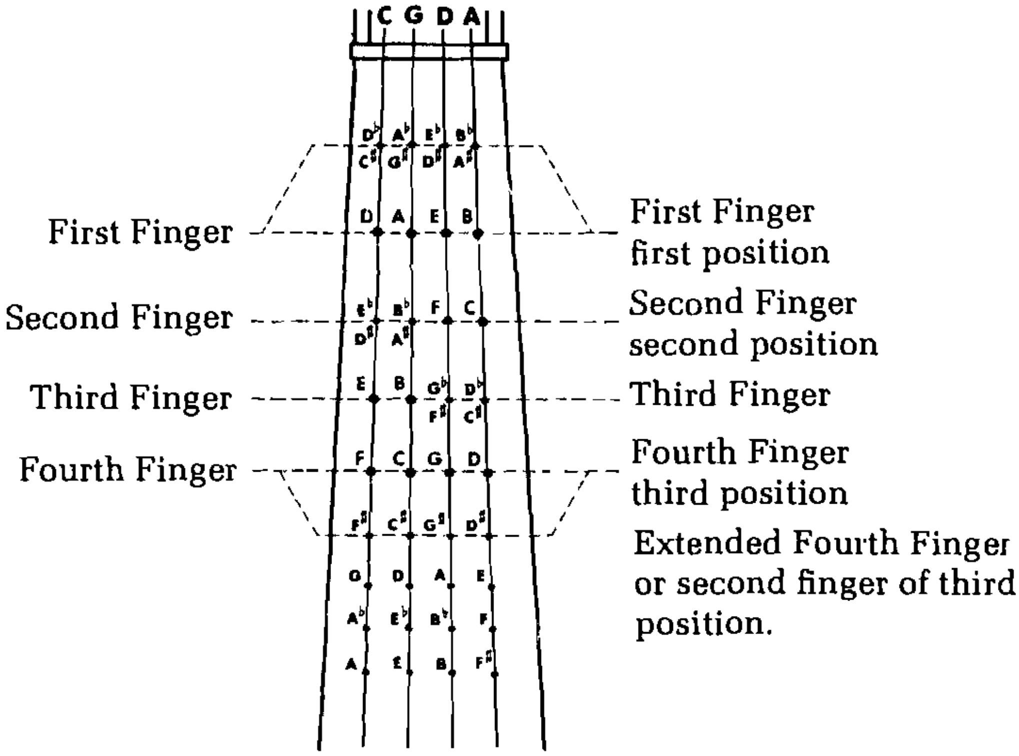
Example III–57. Triple-stops



Example III–58. Quadruple-stops



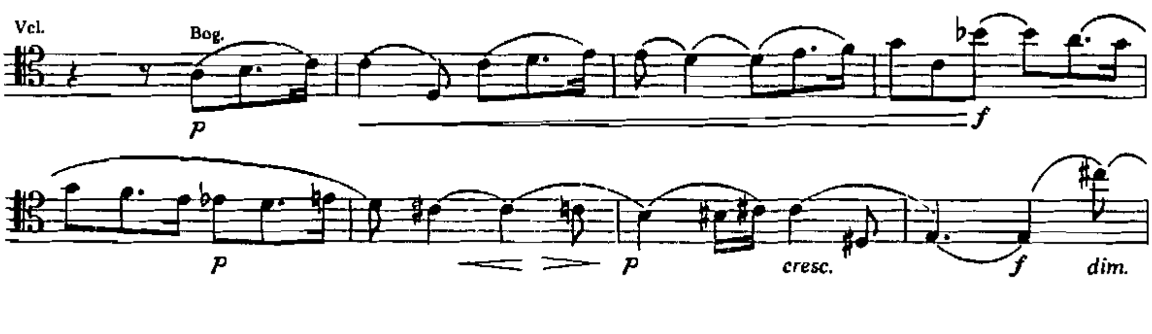
Here is a fingering chart and some combinations showing thumb positions.



It is tempting to indulge in ecstatic descriptions of the cello's tone quality. But the best evidence of the singular beauty of the instrument's sound lies in both solo passages featuring the entire section and those where the cello has a voice within the contrapuntal texture. The D is the most musically captivating string on this instrument; it has a warm and lyrical quality. The A is the most brilliant and piercing; the G, least strong, carries less well than the others. Again, because of its weight and its thickness, the lowest string, the C, is a true sonorous bass of rich quality. Berlioz once said that the cello is not "capable of extreme agility." This statement can be completely ignored today, for the cello can execute practically any technical feat possible on the viola or the violin.

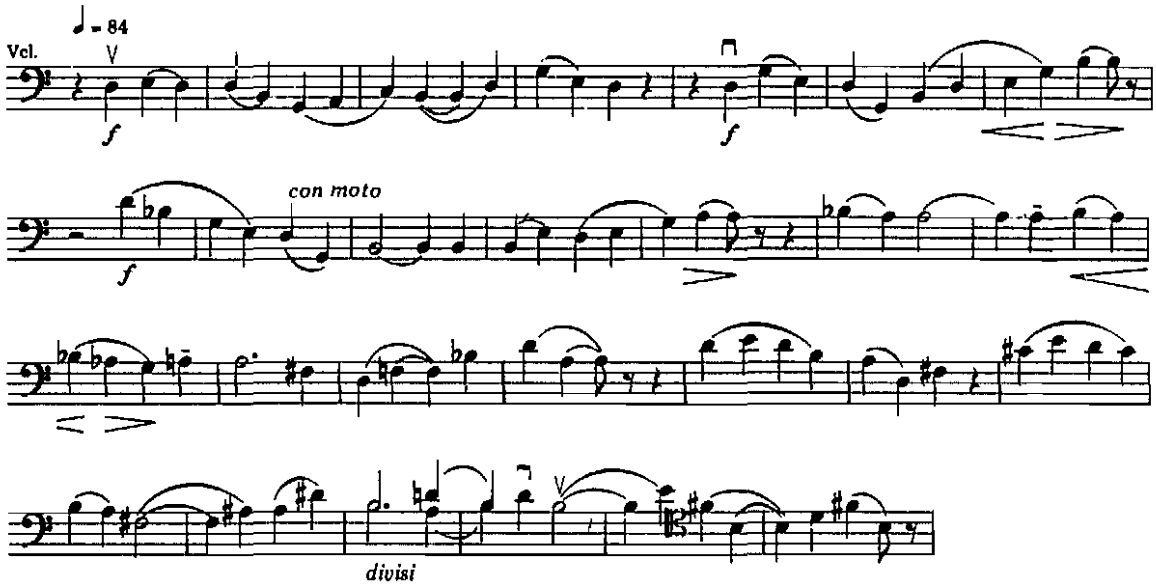
Some representative passages:

Example III–59. Wagner, Prelude to *Tristan und Isolde*, mm. 17–32





Example III–60. Harris, *Symphony No. 3*, first movement, mm. 1–27



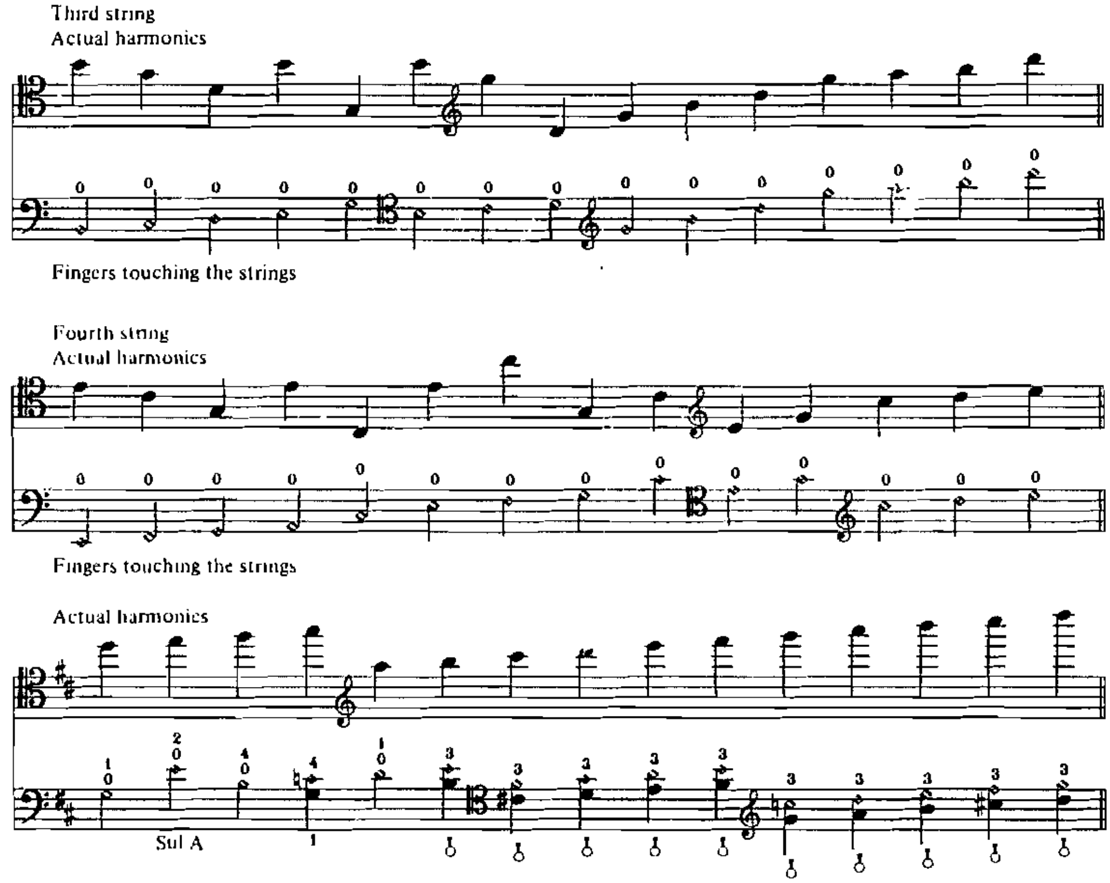
See also:

Brahms, *Symphony No. 3*, third movement, mm. 1–12
Brahms, *Symphony No. 2*, third movement, mm. 194–202
Beethoven, *Symphony No. 3*, first movement, mm. 1–8

Harmonics

The principle of natural harmonics on the cello is identical to that for the other strings, and these harmonics are even more secure on this larger instrument because of the greater length and weight of the strings. The "touch fourth" harmonic is again the most successful for orchestral writing and produces the artificial harmonic of best quality. These artificial harmonics are played with the thumb and the third finger throughout the entire range of the instrument, with the pitch sounding two octaves above the note pressed down by the thumb.

Example III–61



Cellos are frequently used *divisi* for very rich effects, as in the following example:

Example III–62. Rossini, Overture to *William Tell*, mm. 1–10





See also:

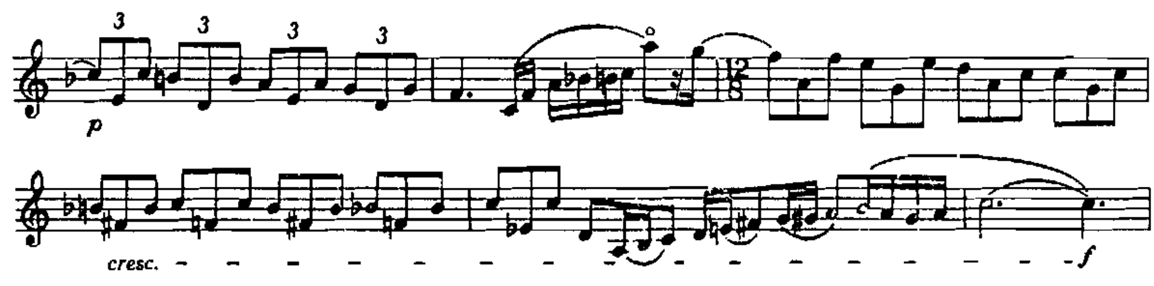
Mahler, *Das Lied von der Erde*, fifth movement, mm. 1–4 at [10]
R. Strauss, *Also sprach Zarathustra*, 18 measures before [10] to 1 measure before [10]

The Solo Cello

The cello literature is quite rich in concertos by the major composers of all creative periods from the Baroque to the twentieth century. Some of the oustanding examples are by Boccherini, Haydn, Beethoven (triple), Schumann, Brahms (double), Dvořák, Tchaikovsky (*Rococo Variations*), Lalo, Milhaud, Hindemith, Barber, Walton, Lutosławski, and many others. Frequently, the cello is used as an occasional soloist in orchestral works. Here is a great passage from the literature:

Example III–63. Strauss, *Don Quixote*, mm. 163–76





See also:

Brahms, *Piano Concerto No. 2*, third movement, mm. 71–86
Bloch, *Schelomo*, mm. 1–15
Schumann, *Symphony No. 2*, first movement, mm. 223–37

Cello in Combination

This subject will be discussed in great detail in the orchestral chapters of this book. Suffice it to point out that the cello is very compatible for coupling or doubling with a great many instruments in all the orchestral choirs. The most widely used couplings are cello and double bass, cello and bassoon, cello and clarinet or bass clarinet, cello and horn, and pizzicato cello and timpani.

Example III–64. Barber, *Essay for Orchestra No. 1*, mm. 1–8



See also:

Beethoven, *Symphony No. 5*, third movement, mm. 162–79
Glinka, Overture to *Russlan and Ludmilla*, mm. 81–100

DOUBLE BASS

Contrabasso (It.), *Contrebasse* (Fr.), *Kontrabass* (Ger.)



James B. Vandermark, double bass

Example III–65. Tuning



The double bass is notated an octave higher than it actually sounds, thus:

Example III–66



All music for the double bass is written in bass, tenor, or treble clef, and sounds an octave lower than written. Change of clef is suggested when there are three or more ledger lines.

Example III–67. Range



This is really the bass voice of the string choir. The practical orchestral range is from the low E (sounding an octave lower) to the treble B♭ (again sounding an octave lower); in solo passages and through the use of natural harmonics, higher notes can be produced. The instrument stands on an adjustable peg and is supported by the player's body and left knee. There are two minor differences in construction between the double bass and the other members of the violin family: its shoulders are sloped rather than curved and it has cogwheel tuning pegs to cope with the thickness of its strings. Many bass players sit on a high stool while performing. Most all of the orchestral bass players use a large, full-sized instrument, while some bass solo performers have used smaller models, which are easier to play and more flexible, but these really do not have the true contrabass quality. One very important fact must be kept in mind, and that is that despite its size, the double bass has a rather small sound by itself. Double bass solos sound thin and distant. A group or section of basses, on the other hand, can raise the roof. Further, because of the very thick and heavy strings, the instrument's "speaking," or articulation, is more sluggish than any of the other string instruments. This should be remembered when basses are doubled by cellos in fast passages, since our bass sections are much larger than those in Beethoven's time. Some of his fast passages are muddied, even by the best orchestras, and conductors have taken liberties because of this peculiar but natural acoustic phenomenon.

Example III–68. Beethoven, *Symphony No. 4*, fourth movement, mm. 319–23



Practical solution for clarification of passage above:

Example III–69



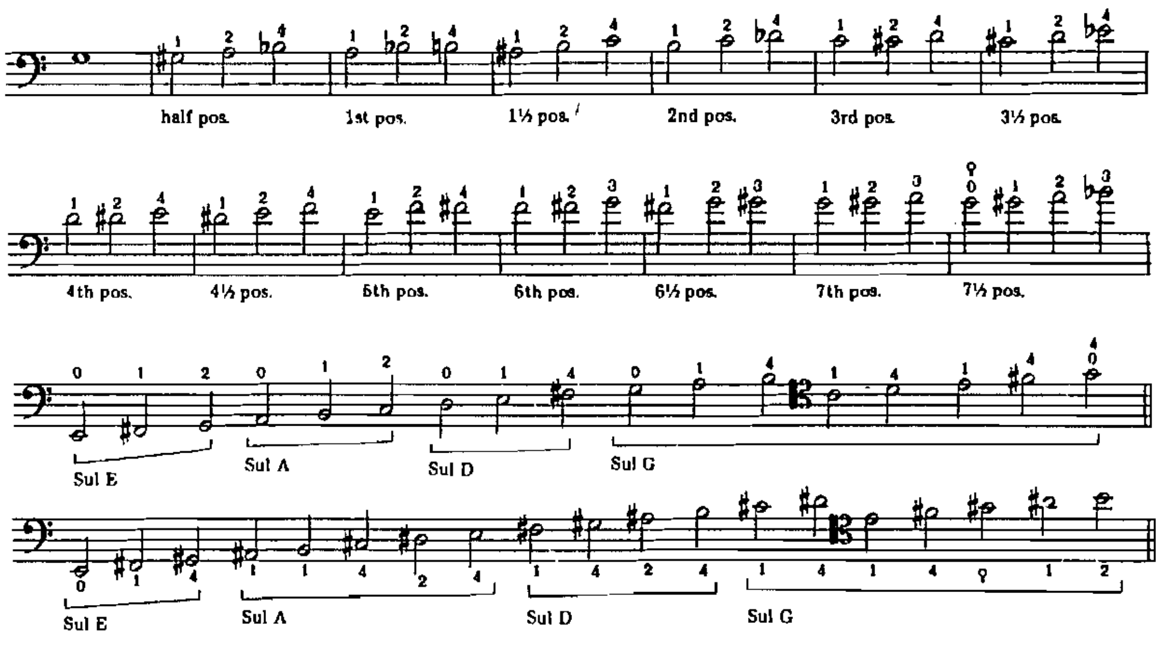
Early Uses of Double Basses

During the Baroque and Classical periods and up to Beethoven, the double bass traditionally doubled the cello for most or all of a composition. Independent bass parts appear rarely, if ever, in purely orchestral literature, although one may find some few instances in opera scores. When the composer desired a lighter bass line, he would simply write *senza basso* in the cello part, and when he wanted the double basses to resume playing, the phrase + *basso* was inserted.

Fingering

The first to fourth fingers encompass a major second in the lower position. The third finger is usually not used independently but is placed on the string, together with the fourth finger up to and including the fifth position. Therefore, first, second, and fourth are used, and after the seventh position, the thumb is also utilized:

Example III–70



A warning must be sounded: the upper range is very effective, but great care must be given to the way it is approached. Unless one writes a piece for virtuosos, this extreme range is best approached by small-scale steps or small skips rather than large leaps. The orientation of the left hand is much more difficult because of the tremendous length of the strings.

Here is an effective orchestral double bass excerpt:

Example III–71. Wagner, Overture to *Die Meistersinger*, mm. 158–65



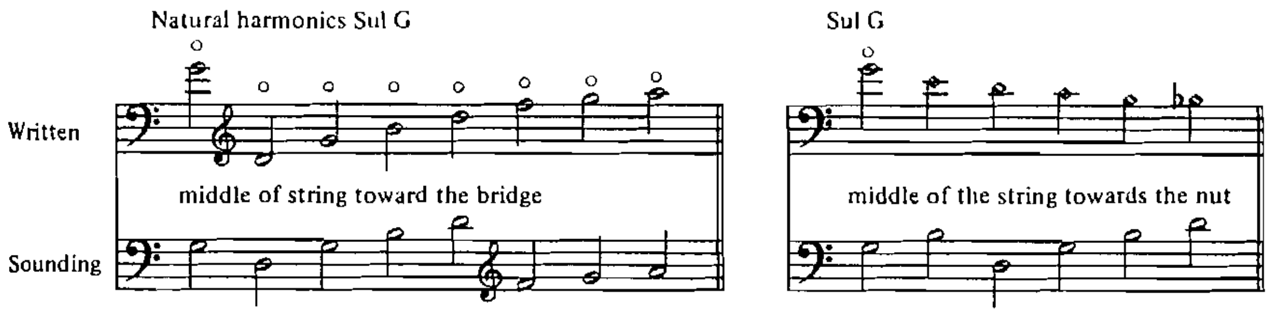
See also:

Verdi, *Otello*, Act IV, mm. 7–18
Beethoven, *Symphony No. 6*, fourth movement, mm. 41–47
Tchaikovsky, *Symphony No. 6*, first movement, mm. 1–6

Harmonics

As has been said before, only natural harmonics should be required of the bass player, and these are most effective. Here is a list of the simplest harmonics:

Example III–72. Natural Harmonics



Double-stops

The use of double-, triple-, or quadruple-stops for the double bass is risky and should be avoided in orchestral writing, unless one or more of the desired pitches are open strings. In the upper positions, because of the closer proximity of the notes, double-stops are more feasible, although it is strongly urged that *divisi* instructions be given to facilitate orchestral bass parts. One can find plenty of exceptions to this rule; nevertheless, that fact does not lessen the great difficulty getting double-stops (without open strings) in tune. Further, close double-stops (seconds, thirds) on the bass in any lower

register are quite thick and muddy, and unless one wishes to hear such sounds as special effects, they should be avoided.

Bowing

Bass players can use all the types of bowing already discussed. All coloristic effects are also applicable and most effective. One must remember that the bow used by double bass players is thicker, heavier, and quite a bit shorter than the violin or even the cello bow. This fact is important when one slurs long passages or asks for a lengthy *tenuto*. The way to do this is to ask the players to change bow at will.

The Five-string Bass

In most orchestras today, at least two or three members of the double bass section have instruments with a C attachment. This means that all chromatic notes from low E-string to the C below are available. If these notes are requested, and there are no players in the section with the attachment, the notes automatically will be played an octave higher. The attachment was originally installed so that all the doubled cello passages could be performed an octave lower than written without the necessity of switching octaves in the middle of the passage when the double bass ran out of notes, while the cello went down to its low C-string. There are even instances (*Pines of Rome*) of *scordatura* requests for low B.

Solo, Concertante, and *Divisi* Basses

The solo concerto bass literature is not very extensive, and one of the reasons is certainly because of the disappointing acoustic carrying power of the instrument as a solo performer in a large hall. After a hiatus of perhaps 200 years, great double bass solo artists have come to prominence in the twentieth century and are commissioning composers to write works for them. There are early concertos by Dragonetti, Bottesini, and Dittersdorf, and twentieth-century works by Koussevitzky, Zimmermann, and others.

Solo passages in nineteenth- and early twentieth-century orchestral literature occur rather infrequently, but concertante and *divisi* multiple independent bass parts abound.

Example III–73. Stravinsky, *Pulcinella Suite*, seventh movement, mm. 1–17



Example III–74. Milhaud, *La Création du monde*, 1 measure before [11] to 1 measure before [12]



See also:

Mahler, *Symphony No. 1*, third movement, mm. 3–10
Stravinsky, *Le Sacre du printemps*, [10] to [12]
Mahler, *Symphony No. 2*, second movement, 1 measure before [4] to 5 measures after [4]
Persichetti, *Symphony for Strings*, first movement, mm. 16–20
R. Strauss, *Also sprach Zarathustra*, mm. 8–22 after [9]

4

Plucked String Instruments

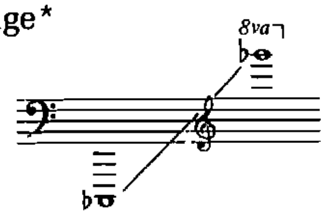
Even though only one of these instruments, the harp, is a regular member of the modern symphony orchestra, the others have been making an appearance more and more frequently, especially in smaller orchestral combinations. Every composer or orchestrator should know at least the number and tunings of the strings, the range compass, and the manner of performance and notation for each of the plucked string instruments currently in use.

HARP

Arpa (It.), *Harpe* (Fr.), *Harfe* (Ger.)

The harp has a very long history as a solo and accompanying instrument. It has gone through a series of alterations increasing and varying its pitches without changing its original concept. The final result is today's double-action harp. This instrument has forty-seven strings and is basically tuned in C♭ major. That is, the seven strings are tuned C♭–D♭–E♭–F♭–G♭–A♭–B♭, and the range is:

Example IV–1. Range*



* With the pedals all the way up.

Eileen Malone, harp



In other words, it encompasses six full octaves plus six additional notes; this means six full repetitions of the seven basic notes plus another repetition of the first five. This is important to understand because the top of each string is attached to a tuning peg and the bottom to a pedal which can raise each note one whole step. The pedal has three positions:

1. Pedals all the way up give one the original C♭ sequence;
2. Pedals one notch down raise all the notes one half step to C–D–E–F–G–A–B;
3. Pedals two notches down raise all the notes a whole step to C♯–D♯–E♯–F♯–G♯–A♯–B♯.

It must be clearly understood that, for instance, all C-strings or all G-strings are controlled by one pedal each, so that if the C♭ is depressed one notch, the entire C♭ series becomes C♮ series. One cannot play a C♭ in one octave together with a C♮ in another octave.* As will be seen later, it is easy to write C♭ as B♮ and play it together with a C♮, because they would be performed on two different strings controlled by two separate pedals. This fact is too often overlooked and misunderstood, but a real comprehension of this first principle of pedaling will make the capabilities of the chromatic harp much clearer. Before we leave this brief discussion of the harp strings, it should be pointed out that the pegs around which the strings are wrapped at the top portion of the harp are turned (i.e., tuned) with a key, and like all string instruments, the pitch of the strings needs

*The two lowest strings on the instrument are not affected by the pedal mechanism and have to be tuned manually. All other strings do change pitches automatically when their pedals are manipulated.

frequent adjustment. To tune a harp is a tedious task, and the harpist is usually on stage long before the rest of the orchestra preparing the instrument. The lowest eleven strings are gut wound with wire; in the remaining unwound gut strings, each C-string is red and each F-string is blue.

Arrangement of the Pedals

The pedals are arranged as follows:

D C B / E F G A

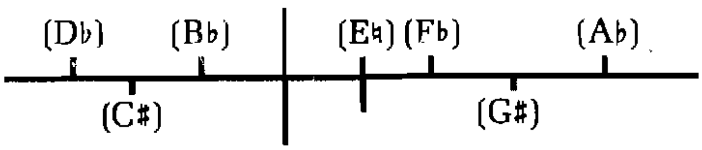
The left three are operated by the left foot while the right four are manipulated by the right foot. Obviously, the harpist cannot cross over because the harp is in the way. Therefore, it is important to know where the pedals are located in order to avoid requesting that the player change the E and G pedal at the same moment, for one foot can change only one pedal at a time.* The D and G pedals could be changed at the same time, since D would be changed by one foot and G by the other.

It is a help to the harpist to indicate how the pedals should be set at the beginning of a work. This can be done in three ways (the first two are preferred). This is the setting for the beginning of Debussy's *L'Après-midi d'un faune*.

1. This is a letter representation and a very clear one:

D♭ C♯ B♭ / E♮ F♭ G♯ A♭

2. This is a graphic representation giving the three degrees or notches, the top being the "all-flats" one.



3. This is neither as clear nor as common as the other two; it gives the setting for the first, then second pedal, etc., on each side. One numbers the pedals, by the way, from the inside out, so that B is No. 1 on the left-hand side, and E No. 1 on the right.

E♮ F♭ G♯ A♭
B♭ C♯ D♭

*It may be of help to learn a little "ditty" which was taught to me by my first orchestration teacher when I was a young boy. It has stuck with me and enabled me to remember the sequence of the harp pedals with no difficulty. I pass it on as a memorizing device:

Did Columbus Bring / Enough Food Going (to) America?

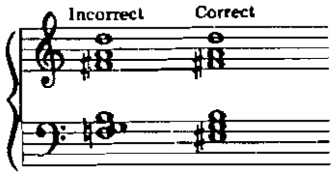
In the famous passage below, the harp really produces only four pitches, B♭, D♭, F♭, and A♭, because all the other strings are tuned enharmonically to sound: C♯ = D♭, E♮ = F♭, G♯ = A♭. This kind of enharmonic manipulation is essential, especially in highly chromatic music. The pedal setting above, for example, could also be used for a phrase such as this:

Example IV–2



On the other hand, the enharmonic spelling may be necessitated by a passage or a chord which calls for both F and F♯ for instance, in which case the F would have to be spelled E♯ or the F♯ spelled as G♭.

Example IV–3



There are many such examples of strange, but practical harp spellings.

As far as pedal changes are concerned, it is usual for the harpist to change the pedal just a split second before playing the note. In this passage, for instance,



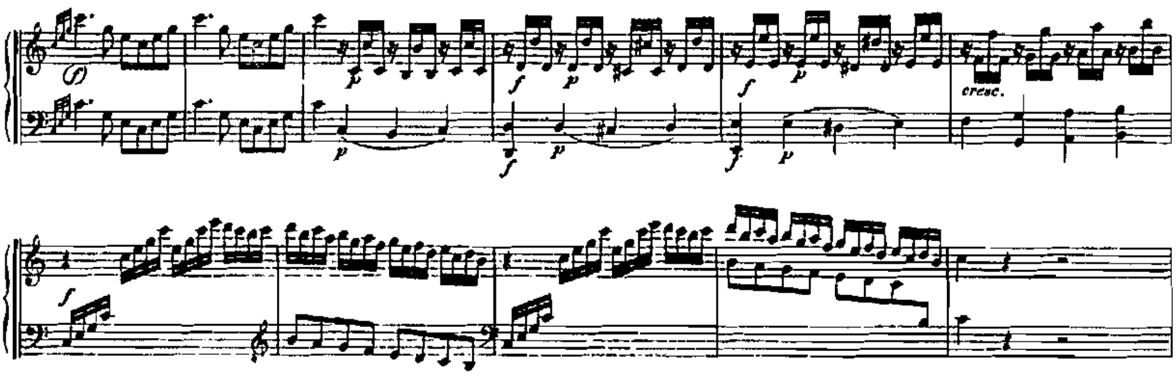
The experienced harpist usually will make the pedal change even later than it is marked. One should not worry about the changes other than to make certain the harpist does not have to change two pedals on the same side at the same time, and that the tempo will permit time for the changes. Highly chromatic music must be carefully handled, and one should study the works of composers like Debussy, Ravel, and Stravinsky for beautiful orchestral uses of the instrument, and the solo works of the great harpists like Salzedo and Grandjany for idiomatic harp writing. Harpists are quite willing to try out new ideas as long as the composer has a well-grounded understanding of the instrument's basic problems.

The tone color of the harp is somber, dark, and sonorous in the lower two octaves, lightening progressively as one goes up the

range. The middle two octaves are very rich and warm, while the top two octaves and a half are light and clear but do not have a great dynamic range. The upper part of the harp has neither a great sustaining power nor a great carrying potential; the *fortissimo* at the top is like a *mezzo forte* in the middle. Because the string is longest when it is in a flat position, the flat keys have more sound potential, but a good harpist can make any key sound well by the power in his hands plucking the strings.

The music for harp is notated on two staves like music for piano, using bass and treble clefs.

Example IV–4. Mozart, *Concerto for Flute and Harp*, first movement, mm. 44–54



Chords may be arpeggiated or played solidly. It is important to remember that the harpist uses only four of the fingers on each hand to play (the little finger is never used); therefore, an eight-note chord is the maximum for the harp. Three-note chords (per hand) spread wide are the most effective. The distance of an octave is much smaller than it is on the piano; for that reason tenths are quite simple to reach. Here is a passage that sounds well on the harp, and the chords are spaced in an idiomatic way:

Example IV–5



It used to be standard procedure for the harpist to arpeggiate or roll all chords, but this is no longer true. Unless a wavy line precedes a chord, the harpist will pluck the chord solidly. Just as we pointed out in string chordal pizzicato, one can indicate the direction by

means of arrows ↓↑ . If there are no arrows, the harpist will roll the chord from the bottom up.

An excellent chordal nonarpeggiated passage can be found at the beginning of the Bartók *Violin Concerto* (mm. 1–13). While Brahms is not particularly known for his harp writing, there is a beautiful passage which ends the first movement of the Requiem (mm. 150–58).

Example IV–6. Bartók, *Violin Concerto*, first movement, mm. 1–13



Example IV–7. Brahms, *Ein deutsches Requiem*, first movement, mm. 150–58



Just to experience one more of the thousands of effective arpeggiated passages in the harp solo as well as orchestral literature, here is an excerpt from Debussy's *L'Après-midi d'un faune* with flute:

Example IV–8. Debussy, *Prélude à "L'Après-midi d'un faune,"* mm. 79–81



Harmonics

Harp harmonics are very typical, practical, and beautifully bell-like sounds. They are produced in two ways, both resulting in the octave harmonic:

1. By the left hand touching the center of the string (at the node) with the lower portion of the palm, and plucking the string with the left thumb.
2. By the right hand touching the center of the string (at the node) with the outside of the knuckle of the index finger and plucking the string with the right thumb.

Two or three or more harmonics can be played at one time by a single hand if the compass is not more than a perfect fifth.

Harmonics are usually notated with a zero over the note so that it will sound an octave higher than written. Some composers write the note at pitch and put a circle over it. This is confusing unless explained somewhere earlier in the score.

For the best results in harmonics, two factors should be kept in mind:

1. Harp harmonics are very soft and must be accompanied very lightly or played *a cappella* to be effectively heard.
2. The most practical range for harp harmonics is between C below middle C to the A above the staff. That middle register sounds best. Above the A the strings get too short for harmonics to sound good, and below that C it is very difficult for the player to reach and stabilize a solid harmonic.

Example IV–9. Debussy, *Nocturnes: Nuages,* mm. 74–78



Example IV–10. Ravel, *Daphnis et Chloé*, symphonic fragments, *Nocturne*, mm. 49–53



The harp can be used as a melodic, as an accompanying, and as a doubling instrument with great success. There are four special color effects which should be mentioned:

1. *Près de la table,* which means plucking the string near the soundboard to give a hard, brittle, almost metallic sound.

Example IV–11. Britten, *Four Sea Interludes*, No. 4, *Storm*, mm. 109–16



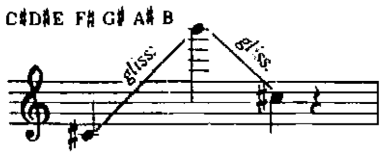
2. *Sons étouffés,* which means that each note is dampened as soon as it is played. The effect is that of a *secco* pizzicato on strings. The passage must be slow enough to permit each finger on the entire hand to dampen the string or strings.

Example IV–12

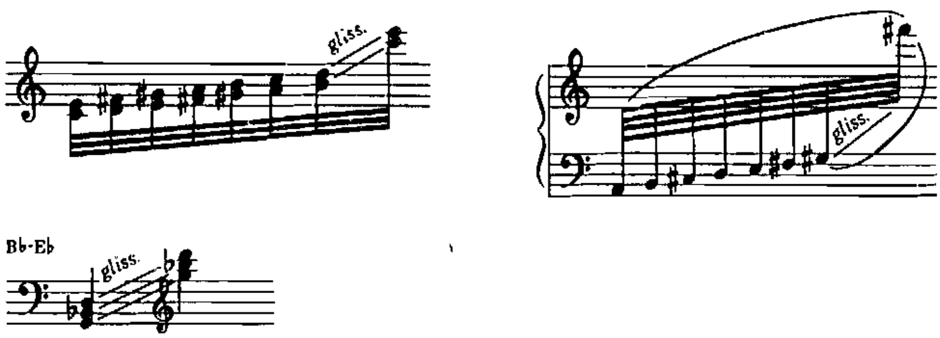


3. Glissando is perhaps the best known harp sound and should not be overused for the sake of "showing off" the harp. Whenever a glissando is written, one must specify how the harp is to be tuned, and give the starting pitch as well as the ending one.

Example IV–13. Glissandi



Example IV–14. Multiple Glissandi



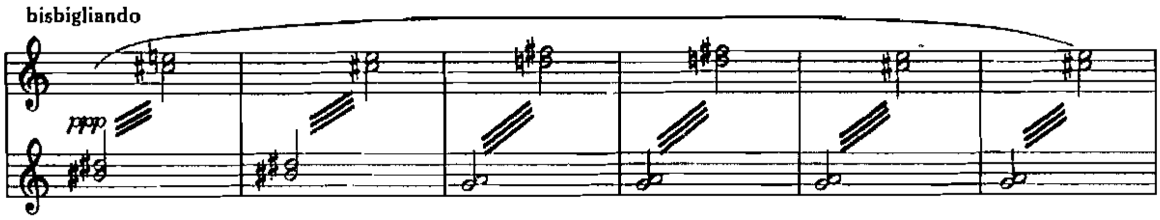
4. Trills, tremolos, and *bisbigliando* (whispering): Trills can be performed by one hand, by alternating hands plucking the same string, or by tuning two strings alike enharmonically, and having the two hands alternate on the two different strings sounding the same pitch.

The tremolo can of course be executed in a normal fashion by the two hands alternating, but a very special rustling or whispering effect called *bisbigliando* at a very soft dynamic is a unique tremolo only a harp can render.

Example IV–15. Trills



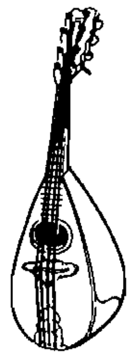
Example IV–16. *Bisbigliando*



Today, composers have devised many other harp effects for which standard notation is still being evolved (see K. Stone, *Music Notation in the 20th Century*, pp. 228–56). Some of these are: 1) knocking on the sound-board; 2) plucking the strings with the fingernails; 3) using a plectrum or pick with which to pluck the strings; 4) calling for harmonics other than the octave harmonic. All these devices are possible, and many more can be achieved. The composer should strive to make his intentions very clear in the notation, and be sure to consult a fine harpist for the feasibility of any unusual technique.

MANDOLIN

Mandolino (It.), *Mandoline* (Fr. and Ger.)

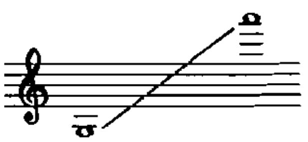


The mandolin appeared occasionally in orchestral scores up to Grétry's and Mozart's day. It then disappeared only to resurface in late Verdi (*Othello*), Mahler (*Symphony No. 7*), Schoenberg (*Serenade*), Respighi (*Roman Festivals*), Stravinsky (*Agon*), Crumb (*Ancient Voices of Children*), and others. The instrument has eight strings tuned in pairs pitched like strings of a violin.

Example IV–17. Tuning



Example IV–18. Range

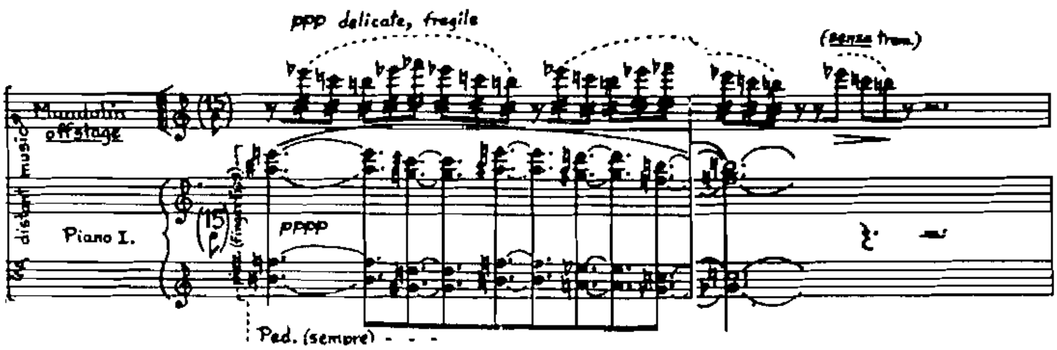


It was favored by Classical composers for the accompaniment of serenades. Single notes and double-stops are plucked with a pick or plectrum; sustained effects are achieved by playing tremolo either the same note on two like strings or two unlike notes on neighboring strings. In order to facilitate finding the notes, the fingerboard is fretted. It is a quiet instrument best used in solo or lightly accompanied by muted strings or soft winds.

Example IV–19. Mozart, *Don Giovanni*, Act II, "Deh vieni alla finestra," mm. 1–10



Example IV–20. Crumb, *Echoes of Time and the River*, fourth movement, mm. 8–9.

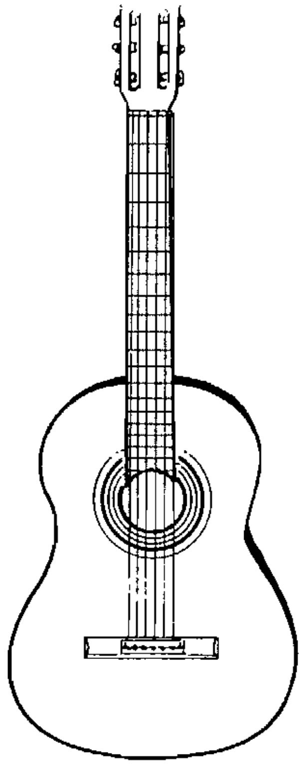


GUITAR

Chitarra (It.), *Guitare* (Fr.), *Guitarre* (Ger.)

The guitar has enjoyed an amazing renaissance in our time. Since folk music has become so popular, everyone seems to be playing the

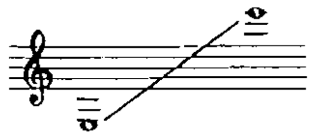
guitar. There are many types of Spanish, guitar: electric, Hawaiian, and classical, to name but a few. Since we are discussing orchestral instruments, we shall limit ourselves to the classical guitar, which is the one used whenever a guitar is asked for unless the composer specifies otherwise. The tuning of the guitar stems from the old lute tunings and is irregular in that it does not maintain the same intervals between each of the six strings:



Example IV–21. Tuning



Example IV–22. Range (All pitches sound an octave lower than notated.)

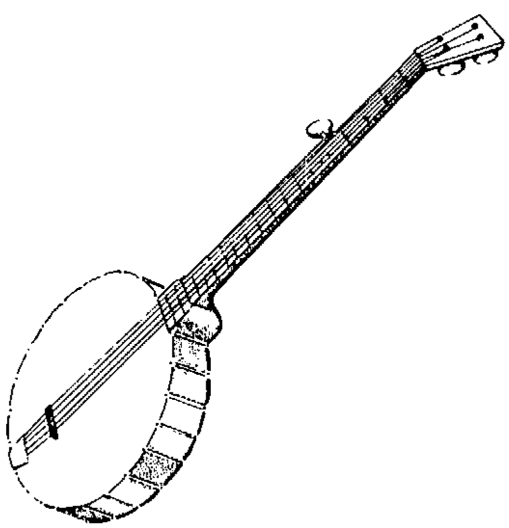


Single-line melodies, chords, and melodies with accompaniments are all possible on the guitar, which is fingered with four fingers of the left hand and plucked with all five fingers of the right hand. A fretted finger board makes it easier to locate pitches. Harmonics, especially natural harmonics, are very effective, but one must keep in mind that a nonamplified guitar is quite soft and harmonics are even softer than natural notes. Therefore, this too is best treated as a solo, in very small combinations of softer strings and winds, or, of course, with voice. There are guitar parts in Rossini's *Barber of Seville*, Weber's *Oberon*, Virgil Thomson's *The Plow That Broke the Plains*, Boulez's *Le Marteau sans maître*, Penderecki's *Devils of Loudon* (bass guitar), and others.

Example IV–23. Stravinsky, *Tango*



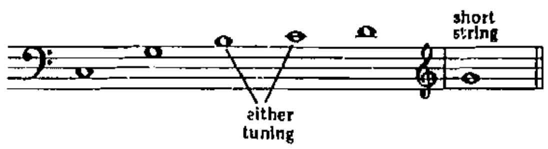
BANJO



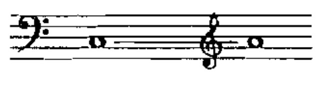
The banjo originated in West Africa and was introduced into this country by Black slaves. Thomas Jefferson wrote that the Negroes brought along an instrument they called "banger." (In Senegalese their lute is still called "banio.") Jefferson himself referred to it as the "banjar." It was a very crude instrument and not really perfected until 1847, during the career of the first banjo professional, Joe Sweeney.

At that time the banjo was very much as it is today, a body like an enclosed tambourine with a long neck. It is played either with or without a plectrum. The five-string banjo used in Blue Grass music and minstrel bands is tuned:

Example IV–24. Tuning



Example IV–25. Range



Tenor Banjo sounds an octave lower than written.

The range of each string is a major 9th above the fundamental tuning; for instance, one could play a fourth-space E on the D string.

The high G is a short string connected to an outside peg and is called the thumb string. It is used for drones, etc. All other strings are fretted, making it easy to find the pitches. There are some banjos with only four strings, and others with five or more regular-length

strings, often tuned quite differently from the five-string tuning above. As a matter of fact, the banjo has been tuned like the guitar, because in the theater orchestras and jazz bands of the '20s and early '30s, guitar players were often asked to double on the mandolin as well as the banjo. To make this more feasible, all the instruments are tuned pretty much alike. As of today, there has been no great movement to use the banjo as part of the orchestra, except in theater orchestras and imitations of Blue Grass music.

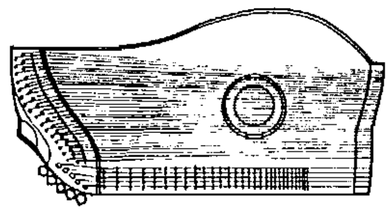
Here is a sample of what typical banjo music looks like:

Example IV–26. Gershwin, *Rhapsody in Blue*, [28]–[29]



ZITHER

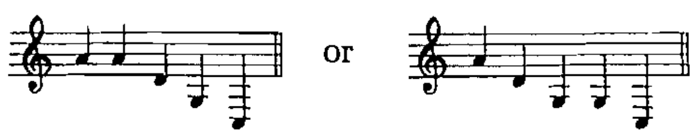
Cythare (It. and Fr.)



This is an ancient instrument which is mostly used for special coloristic effects. Since it was widely played in southern Germany and Austria, composers like Johann Strauss in *Tales from the Vienna Woods* used it to evoke the locale. Not until the latter part of the nineteenth century was a practical modern version of the instrument perfected.

The zither has five melody strings upon which the upper line of the notation is performed by the left hand. These are tuned in either one of two ways:

Example IV–27. Melody Strings



The accompaniment is played with the right hand on twenty-four accompaniment and bass strings tuned in the following manner:

Example IV–28. Accompaniment Strings



Example IV–29. Bass Strings



All these strings sound an octave lower than written.

The instrument lies on a table or stand. The left hand fingers the melody while the right-hand thumb wearing a *plectrum* plucks the strings. The accompaniment is performed by the other four fingers on the right hand plucking the accompaniment and bass strings. All the zither strings may be retuned at the composer's discretion. The tunings given above are the most usual ones.

Example IV–30. Strauss, *Tales from the Vienna Woods*, mm. 75–93



Additional passages involving plucked string instruments in orchestral context:

DeFalla, *The Three-Cornered Hat* (prominent harp), score p. 9, [7] to [10]

Hindemith, *Concerto for Woodwinds, Harp, and Orchestra* (woodwinds and harp), [D]–[E]

Stravinsky, *Firebird* (1919 version) (piano and harp), 11–14

Dukas, *L'apprenti sorcier* (harp harmonies at opening)

Ravel, *Piano Concerto* (harp harmonies), p. 29

Stravinsky, *Tango* (guitar prominent throughout)

Grainger, *Willow willow* (extensive guitar part)

Rossini, *The Barber of Seville* (Cavatina features guitar), score p. 30

5

Scoring for Strings

INDIVIDUALITY WITHIN THE ENSEMBLE

The string section has been the chief lyric-harmonic element in the orchestra for much of the past 250 years. This section, which has evolved into five distinct voices, has the capability to sustain major musical ideas either as a choir within the full orchestral texture or in works for strings alone. It has been said that one never tires of the varied sounds and timbres that strings can produce. This depends, of course, on how this very versatile choir is used, and we shall try to study its potential in a variety of situations in this chapter. Even though it is not the province of this book to discuss the history and technique of string quartet and quintet writing, it is important to call the reader's attention to the great and influential quartets of Haydn, Mozart, and Beethoven. Here are some of the results of the chamber music experimentation which had far-reaching effects on the successful establishment of a five-part string choir, the forebear of the virtuosic string ensemble we find in today's orchestra:

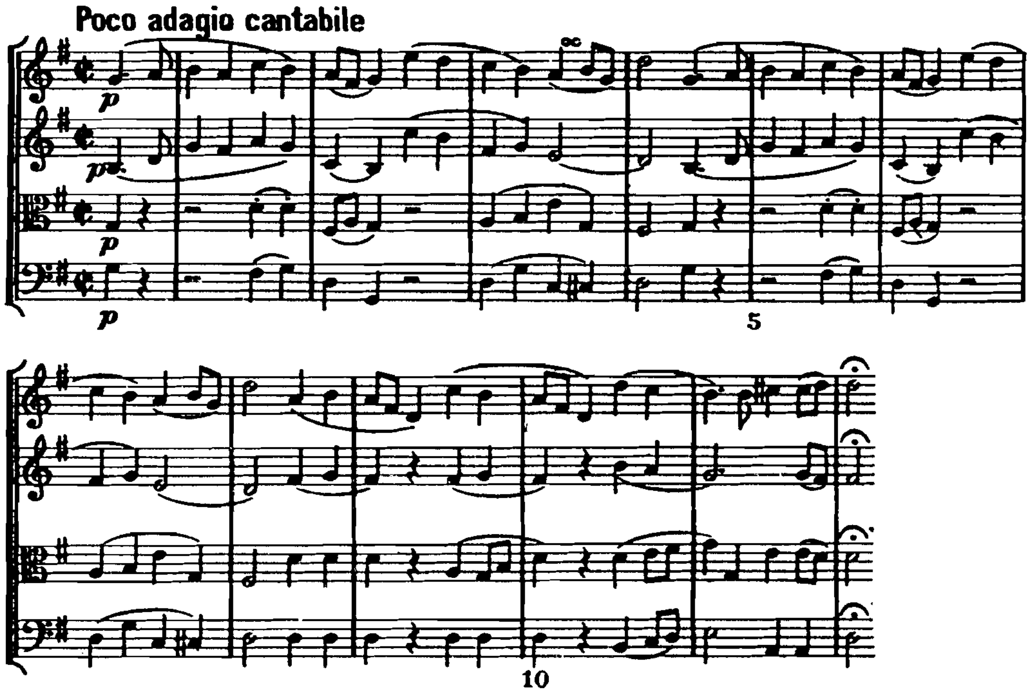
1. the emancipation of the second violin, viola, and cello as equal partners with the first violin;
2. voice crossings for special effects;
3. the consideration of register characteristics of all the instruments for coloristic as well as structural purposes;
4. the extension of the range of all the instruments.

To illustrate some of these points, let us study twelve measures of a late Haydn string quartet, the *Emperor Quartet*, Op. 76, No. 3. This work does not, of course, include the double bass, but that instru-

ment will enter into our discussion a bit later. We shall look at the second movement, which has the famous Austrian national anthem as its theme, and then at some of the variations.

1. The theme is presented in a simple setting with straightforward harmony. Notice the rhythmic coupling of the two violins playing the melodic material and that of the viola and cello providing the harmonic background. Also, one must call attention to the faultless voice leading so important in the exposition of a melody, so as to emphasize and feature it without complications.

Example V–1. Haydn, *String Quartet* Op. 76, No. 3, second movement, mm. 1–12



2. Now we examine a series of variations showing that Haydn regarded each of the four members of the ensemble as an equal partner. In the first variation, the second violin presents the theme while the first plays a "melodized" harmonic counterpoint against it.

Example V–2. Haydn, *String Quartet* Op. 76, No. 3, second movement, Variation I





3. The next variation gives the theme to the cello. This is an important one for us to study, for the cello rises above the second violin in mm. 10–11. One may speculate that Haydn did this because of the more intense quality of the cello in that register, whereas the second violin would be in its weakest register if it had been assigned the cello part. In this setting the second violin is only coupling the cello, which is in a much more opulent register. Notice also that the viola is simply used as a pedal instrument, emphasizing mostly the dominant and tonic notes to fill out and clarify the harmony.

Example V–3. Haydn, *String Quartet* Op. 76, No. 3, second movement, Variation II



4. In Variation III, the melody is assigned to the viola, and Haydn places it above the two violins. This results in a glorious sound brought forth by an instrument too long neglected. Here we must call attention to the fact that Haydn does not bother to place dynamics at the beginning of each variation except the first, where the direction is *sempre piano*. He relies entirely on the registers of the instruments and his scoring to achieve the correct dynamics; but more than this, he assures by his craft that the desired voice dominates, while the others support. In this variation also, we find the cello taking on a supporting role, not simply providing a bass, but providing an involved contrapuntal countermelody.

Example V–4. Haydn, *String Quartet* Op. 76, No. 3, second movement, Variation III



5. The final variation is a variant of the first statement of the theme. The composer restrained himself from using the octave transposition until these last moments in the movement—and how glorious it sounds here, and how climactic! This is a wonderful lesson in orchestration, for too often the extremes in the range are wasted too early in a work, and the final buildup is, as a result, anticlimactic. The other formal factor to notice is that the entire structure is an accumulation of the elements which have slowly entered the harmonic and contrapuntal scheme in the course of the variations and have become a natural part of the statement. (Compare with first appearance of the theme.) The pedal point in the cello is another device used by Haydn to give a feeling of resolution and ending.

Example V–5. Haydn, *String Quartet* Op. 76, No. 3, second movement, Variation IV



While this is, of course, a chamber music piece for four solo players, the principles it illustrates may easily be applied to the string orchestra and, by extension, to the string choir in a symphony orchestra.

A word about the double bass. As the cello took on a greater role as the tenor voice of the strings, the double bass assumed even greater significance, as we shall see in nineteenth- and twentieth-century string writing. In Haydn, Mozart, Beethoven, and Schubert, it is usual for the bass to double the cello in most passages, especially in the tutti sections. When a lighter string texture is desired, the double bass was eliminated. Independent double bass parts became increasingly popular as the nineteenth century progressed, as we shall see in some of the studies in this chapter. If Haydn had used a double bass in the fourth variation, he probably would have doubled the cello (an octave below) for the anacrusis plus the first three-and-a-half measures. He would then have dropped it until the dominant pedal in mm. 8–12, bringing it back once more at the cadence of mm. 15–16. Here is the way it would look:

Example V–6. Haydn, *String Quartet* Op. 76, No. 3, second movement, Variation IV with added bass



FOREGROUND–MIDDLEGROUND–BACKGROUND

All kinds of music have been composed for the string orchestra: homophonic, contrapuntal, thematic, as well as accompaniment music. Three concepts are important to a discussion of the distribution of material in an ensemble situation:

1. *foreground:* the most important voice, which the composer wants to be heard most prominently;
2. *middleground:* includes countermelodies or important contrapuntal material;
3. *background:* accompaniment either in the form of chords or polyphonic/melodic figures.

The composer's skill can be measured by the way he orchestrates these three elements in his music. As we saw in the previous example, Haydn handled them so well that he did not even have to use dynamic markings to achieve balance among the three elements.

The composer must consider each of them, especially the foreground line, with regard to its tonal compass and the emotional intensity he wishes it to project. If this principle idea is to be scored for strings, he must consider the ranges and registers characteristic of each of its five instruments. When he has made these decisions, the resultant scoring of the main theme, idea, or gesture will then provide clues for the scoring of the middleground and certainly the background material.

An example of a successful realization of this procedure will illustrate these points better than volumes of verbiage.

Here is the opening of the slow movement of Brahms's *Symphony No. 3:*

Example V–7. Brahms, *Symphony No. 3*, third movement, mm. 1–14 (Strings only)





Brahms chooses the cello to expose the beautiful theme (*foreground*) surrounded by the remaining strings as *background*. Let us for a moment speculate how the composer came to this decision by rescoring the excerpt in various ways.

Example V–8



1. The first violin, in this register, is very weak and without great emotional force. If it were scored an octave higher, the next statement of the theme would be anticlimactic and subsequent restatements anticipated. (See a similar consideration in the Haydn example.)

Example V–9



2. If the second violin were to play the theme on the G-string, the result would be intense, but of a much darker hue than the upper strings of the cello.

Example V–10



3. The viola sound in this register is quite nondescript and, though mellow, lacks intensity and opulence.

Example V–11



4. The double bass is an unlikely choice because, at pitch, it could only make a caricature of the melody; in a lower register it does not have enough expressive quality to carry the tune. Later in the nineteenth century, solo bass passages or section solos were used for lugubrious or humorous effects.

5. Which brings us to Brahms's choice of the cellos in their lyrical and intense register (Example V–7). The unique cello quality gives the other strings an opportunity to play a soft but exciting accompaniment (*background*) and allows the composer to build up to a higher pitch level in the violin statement. This second statement, though fuller and more heavily scored, sounds much less tense than the original. Certainly Brahms could have stated the theme in the violins as in mm. 12 ff., followed by a cello exposition, but it is the stunning and vibrant effect of the cellos that captures the listener and makes the opening so vital and engaging.

Distribution of Background Material

Before we leave this example, let us look at the distribution of the background material. Many professional orchestrators recommend staying away from the register of the melody line. In some instances, especially when foreground and background are performed by instruments of similar color, this is good advice. But in this case, we must consult our knowledge of register characteristics:

1. The foreground line is in the best register of the instrument to which it was assigned.
2. The background figures are in the palest or most nondescript registers of the instruments to which these were given, including pizzicato in the double basses.

If the violins and violas had been scored an octave higher, they would have attracted too much attention to the background; they would also have anticipated the fact that the violins would repeat the melody at the higher pitch level soon after the cellos' initial statement. In other words, Brahms saves the higher violin color for the more important foreground statement and assigns the soft swirling background to middle-register violins and violas, while the cellos dominate in their best voice.

Another important consideration is the character or the figuration of the accompaniment itself. Notice the radical rhythmic and expressive difference between the foreground and the background elements. The swirling accompaniment is repetitous and simple. It serves to add intensity to the longer notes of the melody, leaving the  figure undisturbed. The conductor may then ask for a bit of "soloistic rubato" for the anacrusis in order to create an even freer melodic exposition of the theme. It is also important to notice how the arpeggiation is dovetailed to create extreme smoothness without any pauses in the texture.

One must not fail to mention the role of the flutes and bassoons which clarify and support the arpeggiated harmony, a purpose which will be discussed in the combination chapter of strings and winds. Here it is certainly another stabilizing and enriching element.

This passage embodies many questions the composer must answer before embarking on the orchestral scoring. There is no doubt that Brahms "heard" exactly what he put down and did not have to go through the process of elimination we employed before deciding to assign the melody to the cellos, but this decision was the result of a long and intimate relationship with the orchestra and of having heard, conducted, and yes, rescored many of his earlier works. The idea of choice is most basic not only for the compositional but also for the orchestrational process. The more a composer knows about the tonal, registral, and technical characteristics of the instruments, the more successful and colorful his score.

Other Successful Statements of Foreground Material

Sometimes a forceful unison or octave statement may be used in the antecedent of an idea, followed by a change of texture to emphasize the different emotional quality of the consequent as in the following:

Example V–12. Mozart, *Eine kleine Nachtmusik*, first movement, mm. 56–62



We have already used a term that needs further amplification because it will continually turn up in the discussion of orchestral processes: coupling. This term describes two instruments playing the same passage at parallel intervals, as in the second violin and viola parts, mm. 60–62 of the example above. Even though it represents only a slight change of texture and dynamic, a simple paralleling of the accompaniment in thirds registers a tremendous emotional contrast to the stark octaves in this style.

Mozart was a master at "sleight of hand." In the following short example, a sudden cessation of the Alberti-type accompaniment figure changes the mood of the predictable, settled statement to a light, ethereal texture which highlights the second phrase of the theme.

Example V–13. Mozart, *Eine kleine Nachtmusik*, second movement, mm 1–8



The following examples illustrate again how orchestration serves form and content, and how it can aid in clarifying a work, or even a phrase, by means of texture, accent, or color. This is true not only in the Classical era, but in all creative periods in music.

1. Building an orchestral crescendo by adding octaves until triple *forte* is reached.

Example V–14. Beethoven, *Leonore Overture No. 3*, mm. 514–31



2. Using string unison staccato to contrast with the piano timbre, as well as the rich harmonies and legato of the solo instrument.

Example V–15. Beethoven, *Piano Concerto No. 4*, second movement, mm. 1–30



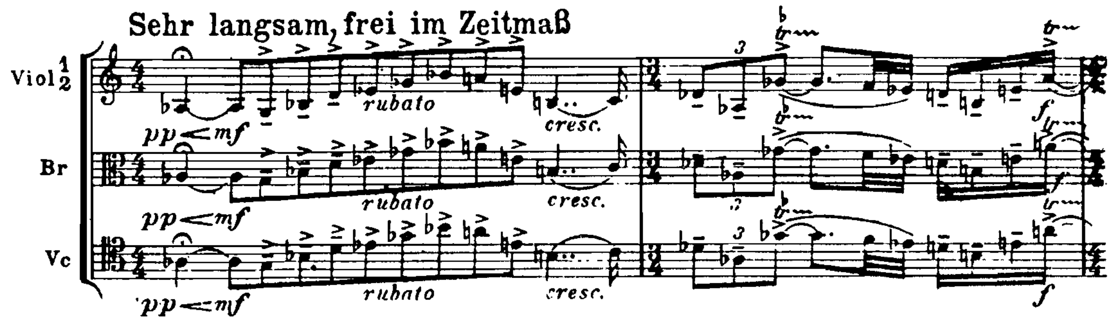
3. The simple addition of the cellos and double basses, and a bit of "melodizing" of the harmony in the second violins sets off the first and the second statement of the theme and prepares so well for the tutti version that is to follow. Notice also that the second time the theme is stated it is an octave lower to allow the woodwinds to be heard when they enter, and to make the color more distinct.

Example V–16. Haydn, *Symphony No. 103,* first movement, mm. 40–48



4. Hindemith begins the last movement of the symphony *Mathis der Maler* with a very powerful unison. It builds great tension, and prepares well for the tutti chords to follow.

Example V–17. Hindemith, *Mathis der Maler*, third movement, mm. 1–6





5. Here is a beautiful way to open a slow movement with strings alone. Notice the violins in their rather nondescript register are doubled to give them more body. The cellos and basses are kept rather low and the violas play a contrasting rhythm *divisi* so as to not interfere in the flow of the melody.

Example V–18. Schumann, *Symphony No. 2*, third movement, mm. 1–5



6. One more effective presentation of a theme by strings alone, this one of a lighter character. The first violins present the sprightly tune, and when they reach into their lower register, they are doubled in octaves by the cellos. This addition contributes a feeling of greater resolution to the passage and prepares the listener for the woodwind scale interlude leading to the repetition of the first theme.

Example V–19. Shostakovich, *Symphony No. 6*, third movement, mm. 1–7





CONTRAPUNTAL TEXTURES

Although we have been taught that two melodies superimposed one upon the another result in a contrapuntal texture, there is a grey area of foreground, middleground, and background in orchestral music which presents serious scoring problems. The difficulty is twofold: First, one must sort out the three elements so that they communicate in the exact order of priority in which the listener is to comprehend the material. Secondly, the composer has so many choices of colors that he must limit his options, especially if a passage is to be repeated more than once.

In this example from the second movement of his *Symphony No. 7*, Beethoven has the first violins play the very simple tune, the seconds play the countertheme, and the violas, cellos, and double basses supply the background harmony.

A further word about Example V–20: even though the voices are close together in register and homogeneous, it works successfully for two reasons:

1. Each of the three parts has its own characteristic rhythm and special articulation.

Example V–20. Beethoven, *Symphony No. 7*, second movement, mm. 51–66



2. The foreground and middleground themes were introduced earlier without the background. As a matter of fact, the first theme was played all by itself at the very beginning of the movement.

These factors add immeasurably to the clarity of this passage and suggest ways of solving the complex foreground–middleground–background problem.

Polyphonic writing for strings has been popular since the early baroque, when the Italian masters, as well as Bach and Handel, firmly established the instrumental style. Since each of the voices of the string choir is technically capable of performing almost equally elaborate gestures, fugal, canonic, and other contrapuntal writing can be most effectively accomplished by the string section. Many times the exposition of a fugue or fugato is assigned to the strings before it is developed, colored, or doubled by other members of the orchestra. This has proven to be a most effective device.

When there are contrapuntal passages to be scored for strings alone, the two major considerations, as always, must be clarity and balance. These can best be achieved by:

1. placing the most important melody in the best possible register of an instrument;

2. thinning the counterpoint to let the main theme break through;

3. separating theme and countertheme registerally (one high, one low; or vice versa);

4. seeing to it that the countertheme is sufficiently different rhythmically from the subject (theme) so they don't interfere with one another when the two are stated together.

Of course, one can always resort to marking different dynamics such as *forte* for the foreground and *piano* for the background material, yet this is not always as effective as the other ways.

Here are some contrapuntal passages from both the string orchestra and the full orchestra literature. Study these passages.

1. Vivaldi, *Concerto Grosso*, Op. 3, No. 11

A typical fugue exposition starting with the basses and cellos, then violas, second violins, and finally the firsts—the traditional sequence of entrances. If Vivaldi had opened with the first violins, he would have been obliged to reverse the order of entrances exactly. If the second violins had begun, there would have been a choice of either first violins, then violas and basses, or violas, first violins, then basses. The first alternative discribed above (2nd Vl., Vla. C + DB) was preferred by the Baroque masters. A similar scheme would be employed if the viola were to begin the fugue. It is important to understand that although the group is homogenous, the subject comes through because of the rhythmic differences between the foreground (subject), the middleground (countersubject), and the back-

Example V–21. Vivaldi, *Concerto Grosso* Op. 3, No. 11, first movement, mm. 35–54





ground (continuo or harmony). In a fugal exposition the subject heard alone at the beginning carries added weight and makes the listener constantly aware of it. Further, the subject is a strong one with easily recognizable rhythmic figures. In addition, the anacrusis-type opening gives it added carrying power against a rather active counterpoint in the other voices.

2. Bach, *Brandenburg Concerto No. 3*

In this magnificent excerpt for six violins, three violas, three cellos, and double bass, we find very sophisticated contrapuntal writing which illustrates again how important rhythmic characteristics are in bringing forward the individual voices. During the Baroque era none of the composers extended the instrumental range too far; thus emphasizing individual parts within a basically homogenous ensemble became more of a challenge. Toward the end of the example, Bach brings the work to a rich homophonic climax which provides great contrast and fulfillment to the preceding contrapuntal section.

Example V–22. Bach, *Brandenburg Concerto No. 3*, first movement, mm. 76–92



3. Weber, Overture to *Euryanthe*

Another string fugal exposition, this time from the Romantic era. As in earlier examples, the composer is careful to separate the elements by distinct rhythmic characteristics and, like Bach, he alternates freely between contrapuntal and homophonic passages.

Example V–23. Weber, Overture to *Euryanthe*, mm. 144–59



4. Bartók, *Music for String Instruments, Percussion, and Celesta*
The exposition of this extraordinary Bartók fugue is a bit more complex than any of the previous examples. The composer sets up a formula of ever-moving eighth notes. Of course, the entrances of the subject are always noticeable, but the counterpoint balances this constant motion, giving the impression of a large arch. The freely imitative as well as canonic imitation between the voices adds to the feeling of heightening tension, which never really settles down until the entrance of the timpani in m. 34. The lack of rhythmic definition in each voice, or, to put it positively, the great similarity in the lines, creates an atmosphere of unruffled contemplation in the midst of tension.

Example V–24. Bartók, *Music for String Instruments, Percussion, and Celesta*, first movement, mm. 1–34




2. Vl.
3.4. Vl.
1.2. Vle.
1.2. Vlc.
1.2. Cb.
con sord
pp
20
25
1. Vl.
con sord.
p



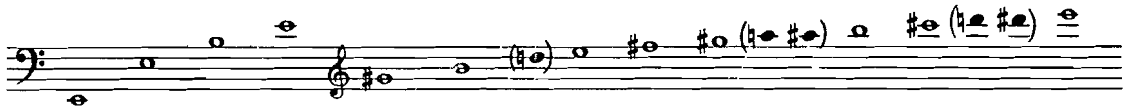
HOMOPHONIC WRITING FOR STRINGS

The distribution of the pitches in a predominantly harmonic or homophonic passage is an important assignment. Spacing, register, and melodic considerations should once again be the major factors in determining exactly who should play which pitches, especially in strings, where the overall color is so homogenous.

Let us first consider the scoring of some isolated chords and then study a masterful passage from the literature.

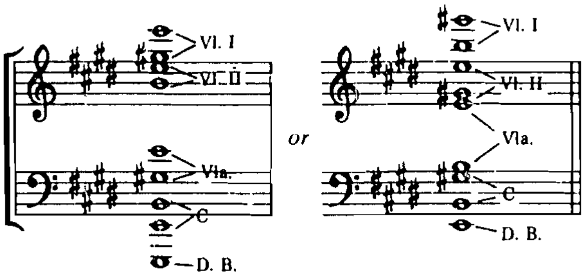
We have already referred to the importance of the overtone series in the chapter on the individual instruments. In the matter of spacing a chord and the doubling of pitches, we must invoke this musical phenomenon once again. Here is the overtone series on E:

Example V–25



A large tutti string chord could be effectively spaced:

Example V–26



Both chords can be played *piano* or *forte*. The first would be a bit darker than the second because of the lower octave of the basses and the wider spacing at the top, but the difference is not too great. All instruments are given a traditional place in the distribution. Notice that one usually leaves greater space between the lower than between the upper instruments, just as there are greater distances between the more sonorous lower partials than between the upper partials of the overtone series.

Less spread in the chords gives the composer greater choices. Considering some close chords such as these,

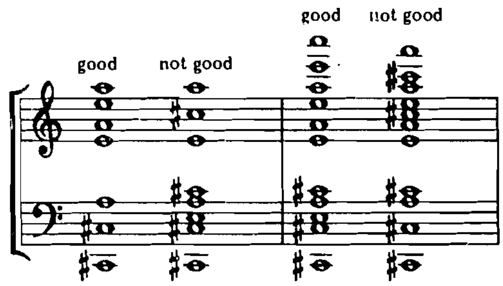


this progression may be scored in one of the following ways:

1. Straightforward scoring—violin I, soprano; violin II, alto; viola, tenor; cello, bass; double bass, doubling the cello an octave lower. This would result in a rather nondescript setting if the dynamic were *p* to *mf*, but would prove very bass-heavy if the dynamic were loud, since the violas, cellos, and basses are in a much better register than the violins.
2. Violas *divisi* take the upper two parts while the cellos *divisi* take the lower two. The result of this combination would be a very mellow, darkish sound.
3. Adding the bass an octave lower would greatly darken the line.
4. The first violins on the soprano with the second violins or the violas divided playing the alto and tenor part would give a slightly lighter but still subdued color to the progression.
5. All cellos with the double basses doubling the bass at pitch would, of course, be very intense.
6. The entire progression could be transposed up one octave, then two octaves, and become quite sparkling without using the double bass at all.

If there were a first-inversion chord in that passage, we would have an additional doubling problem, since we have learned that it is out of style to double the bass (the third) except when it is the first (VI^6), second (VII^6), fourth (II^6), or fifth (III^6) degree scale step. In the often-used I^6, IV^6, and V^6 chords, special attention should be given to the spacing and doubling, for if there are more than four voices, the third of the chord (bass) would invariably be doubled somewhere to strengthen it. It is advisable to double it near the bottom and leave the "open" sound so characteristic of this inversion intact.

Example V–27



Before we discuss some homophonic passages from the string literature, let us consider the successful scoring of a string melody in an orchestral work.

What can be done to strengthen this melody?

Example V–28



1. It can be played by the first violins without accompaniment.
2. It can be played by the second violins and doubled by the first an octave higher.
3. It can be doubled at the unison by another instrument:
   a. violin I and II c. violins and cellos
   b. violins and violas d. violas and cellos
4. It can be played *sul G* on the violin.
5. It can be played as a viola or a cello solo, since both instruments would be more intense in that register than the violins.
6. It could be distributed over four or five octaves and played by all five strings.
7. It could be performed in unison by both violin sections, violas, and cellos.

Now let us examine the beginning of the *Serenade for Strings* by Tchaikovsky to see how he handled some of these problems.

(A) The theme is presented fully and richly harmonized. All double-stops are certainly playable *non divisi,* but usually the second violins, violas, and cellos are divided, while *divisi* would weaken the first violin line. Notice that the melody notes of the first violin

Example V–29. Tchaikovsky, *Serenade for Strings*, first movement, mm. 1–36.



are always doubled but not necessarily by the same instrument at all times. In mm. 1 and 2, the second violin (lower notes) doubles, while in the mm. 4 and 5 the viola doubles. The composer emphasizes the harmony rather than the melody in mm. 3 and 6 by the phrasing and the dovetail position of the second violin, whose pitches are reinforced by doublings in violas and cellos. Notice the effective spacing of the very first chord, which is intense but quite bright, and the chords in mm. 7 and 8, which are sonorous, but a bit more mellow. The dovetailing of violas and second violins emphasizes the E, which is much stronger played by the violas than by the second violins and is, after all, the melody note.

In m. 8, a scale in octaves takes us to the second statement of the melody, this time in the bass. Great intensity is lent to this statement by the rather high double basses, and the thin texture which accompanies the tune even when played *ff* cannot interfere with it, for all violins and violas are in a nonbrilliant register. How stunning the big chord in measure fifteen sounds after this pale, subdued harmony. Be sure to notice the distribution of this chord and the ease with which it can be performed; no problem fingerings are encountered for any instrument, and since any double bass chord in the key would have to be played *divisi*, the composer chooses to assign a single well-placed tonic note to the instrument. The low C on the cello is sonorous enough to carry.

From **(C)** to **(D)** Tchaikovsky achieves a diminuendo by his scoring. From mm. 17 to 22 the close voicing, especially in the high cellos, gives a tense account of the theme and the harmony. From m. 18 to **(D)** the sound is mellow, and even though loud and intense, the homogenous sound of all the strings meshes as if it came from one instrument.

From **(D)** to the end is a marked diminuendo, in which a cadential formula is repeated three times. All instruments are in a register where a soft dynamic is easily possible, and the thinning out is emphasized by the drop-out of the bass each time it reaches the tonic note. Notice the articulation change from m. 32 to m. 33. The last time the double basses do not slur but bow the high E. Their dropping out is thus even more pronounced, and the articulation allows the E to sound a little longer, since the chords in the other strings are held.

Another most effective example of strict homophonic string writing is the excerpt from Grieg's *Peer Gynt Suite No. 1* on the facing page. Everything is doubled at the octave, as if the piece were played on the organ with an eight-foot stop plus a four-foot stop doubling the original version an octave higher. In order that the listener may clearly hear two phrases in each of the four measures, Grieg doubles

Example V–30. Grieg, *Peer Gynt Suite No. 1*, "Aase's Death," mm. 17–24.



the strings differently in the antecedent and the consequent. Notice that in mm. 19 and 23–24, the second violins double the first with an added octave, instead of providing more harmony. In order to study this example more closely, it is advised that one make a simple four-part reduction for piano, and then compare it with the original orchestration. The lush romantic sound for strings is an important color to master.

Analyze the following string works for spacing, articulation, and disposition of foreground, middleground, and background material:

Dvořák, *Serenade*
Mahler, "Adagietto" from *Symphony No. 5*
Bloch, *Concerto Grosso I*
Britten, *Simple Symphony*
Honegger, *Symphony No. 2 for Strings and Trumpet*
Bartók, *Divertimento*
William Schuman, *Symphony for Strings No. 5*

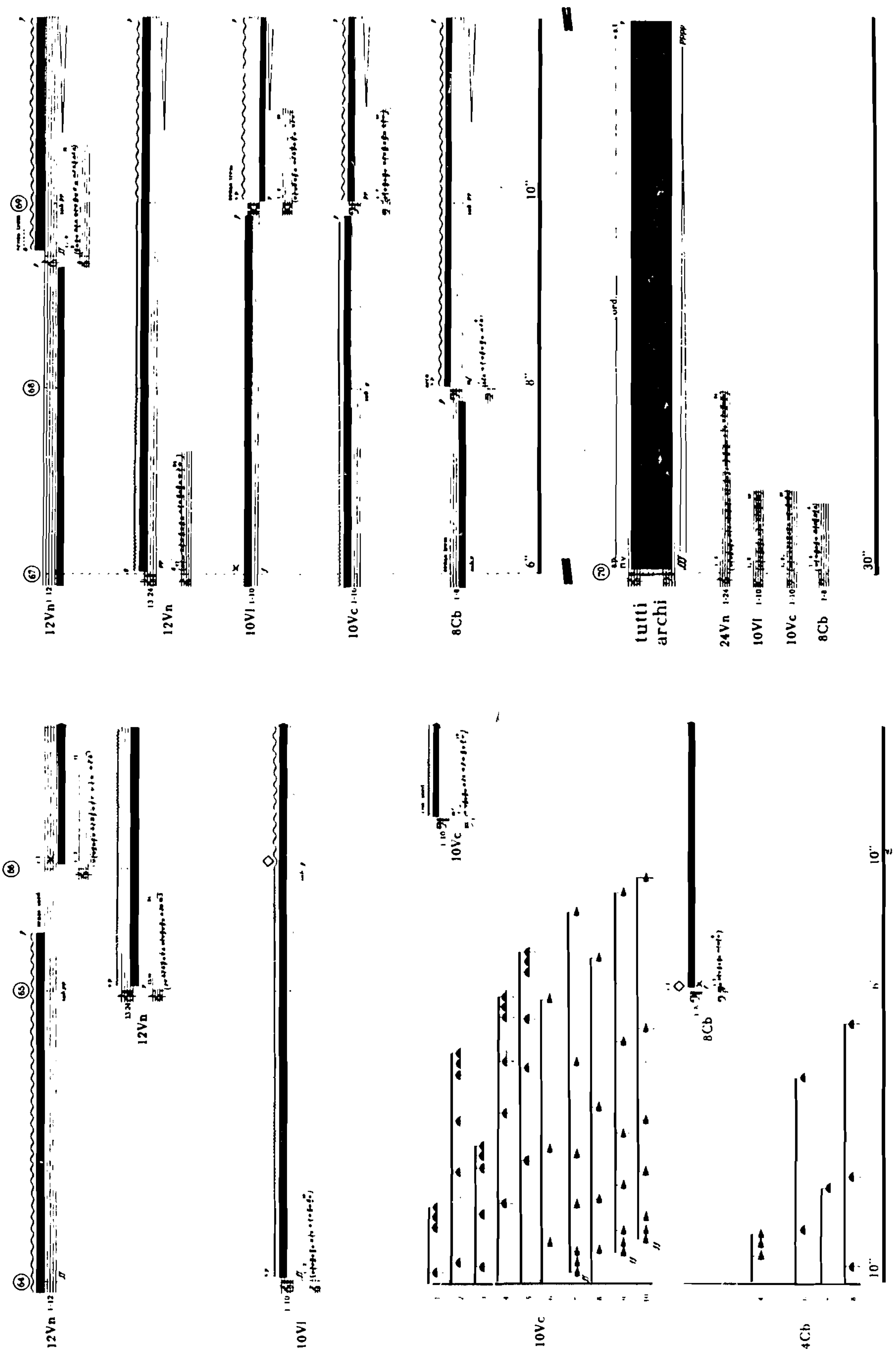
A work such as the *Threnody* by Penderecki should also be studied as a prototype of a mid-twentieth-century string work. Notice that the composer specifies the exact number of instruments needed, for he often divides them so that each plays a separate pitch. Color is the important parameter here, and Penderecki takes full advantage of everything the instruments can do and invents some new tricks. Study these pages very carefully:

Example V–31. Penderecki, *Threnody*
a. Guide to the notation

𝄲	sharpen a quarter-tone
𝄰	sharpen three quarter-tones
𝄭	flatten a quarter-tone
𝄬	flatten three quarter-tones
▲	highest note of the instrument (no definite pitch)
↑	play between bridge and tailpiece
⇈	arpeggio on 4 strings behind the bridge
┼	play on the bridge by bowing the tailpiece at an angle of 90 to its longer axis
†	play on the bridge by bowing the wood of the bridge at a right angle at its right side
⸸	percussion effect: strike the upper sounding board of the violin with the nut or the fingertips
⊓ v	several irregular changes of bow
~~	molto vibrato
∿∿	very slow vibrato with a ¼ frequency difference produced by sliding the finger
⌇	very rapid non-rhythmisized tremolo
ord.	ordinario
s. p.	sul ponticello
s. t.	sul tasto
c. l.	col legno
l. batt.	legno battuto

The thick horizontal lines indicate the approximate range and position of the cluster to be executed by the designated *divisi* instruments. The exact pitches are given below each cluster.

b. Last two pages of the piece



THE STRING CHOIR AS AN ACCOMPANYING GROUP

Because of the homogenous quality of the string choir and its great technical and dynamic resources, it is frequently used to accompany an instrumental or vocal soloist, a chorus, or an instrument or group of instruments in a purely orchestral work. Hundreds of different patterns have been formulated for this purpose, and we shall examine some of the more popular ones. The possibilities are almost limitless, but a quick study of these traditional formulas may give some notion of what can be done.

A. Three excerpts from Mendelssohn's *Elijah*

1. Simple harmonic on–off beat accompaniment

Example V–32. Mendelssohn, *Elijah*, "It is enough," mm. 1–9



2. Sustained harmony notes plus "agitated" violin figures

Example V–33. Mendelssohn, *Elijah*, "Hear ye, Israel," mm. 1–7



3. Sustained harmony notes plus arpeggiated violin figures

Example V–34. Mendelssohn, *Elijah*, "He watching over Israel," mm. 1–5



B. From Mozart's *Marriage of Figaro,* a magnificent agitated string counterpoint which highlights the frantic action in the opera at that moment:

Example V–35. Mozart, *Le Nozze di Figaro,* Act II, No. 14, mm. 1–13

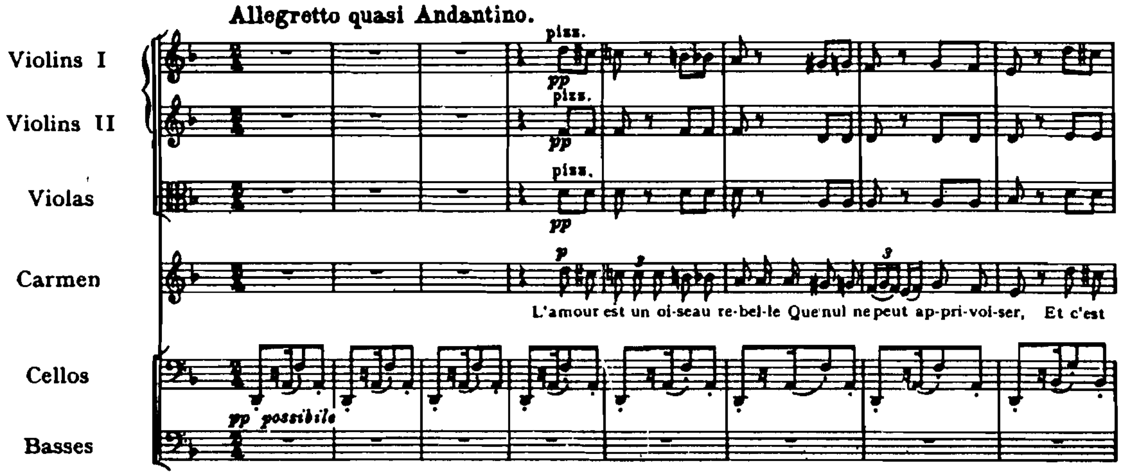




C. Two excerpts from Bizet's *Carmen:*

1. In the famous *Habanera,* the cellos provide the "ethnic" or characteristic rhythm of the dance, while the rest of the strings support the singer both melodically and harmonically playing pizzicato. Notice that the singer can execute her part without orchestral interference.

Example V–36. Bizet, *Carmen,* Act I, "L'amour est un oiseau rebelle," mm. 1–8



2. In the prelude to the opera, Bizet uses a cliché device to invest the theme with a suitably ominous quality: the cellos (doubled by trumpet, clarinet, and bassoon but not shown in the short score above) render the tune with the upper strings tremolo providing the accompaniment.

Example V–37. Bizet, Prelude to *Carmen,* mm. 121–31



D. In order to produce a somber background, the lower strings only may be used to accompany the melody. Two famous examples of the Fauré *Requiem*, which provides a dark-hued harmonic background for the *Requiem* text. The strings often double the organ, as in the passage quoted below.

Example V–38. Fauré, *Requiem*, Introit and Kyrie, mm. 18–25

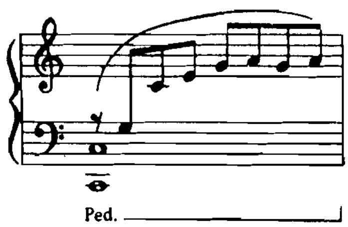


TRANSCRIBING FROM PIANO TO STRINGS

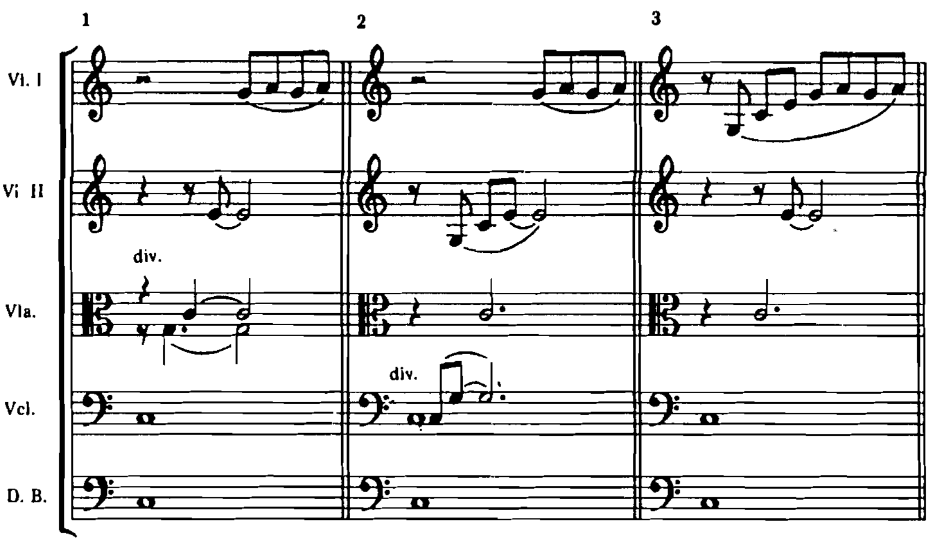
One is often called upon to transcribe a piano accompaniment for strings. There is a variety of ways to accomplish this task, but the most important consideration must be the realization of the composer's intent without distortion. Of course, piano figuration is not always simple to transcribe, but one must take great care to uphold the spirit of the accompaniment even though the figuration is somewhat adopted for the strings. Dovetailing becomes very important to recreate the smoothness that a single player can achieve on a single instrument. Naturally, one must not dovetail parts if an accent is required. Further, the sustaining pedal must be taken into consideration.

Let us see, first, how the effect of the sustaining pedal may be simulated:

Example V–39a. Piano Version



b. Three String Versions



Now let us take a few accompaniments and find solutions for them. Before we do, however, it is important to point out that there are many simple piano accompaniments, such as afterbeats, sustained harmonies, even certain figurations, which can simply be copied out into string parts. These we do not have to address here.

Example V–40. Schubert, *Rückblick*, mm. 1–2
a. Piano Version



b. Two String Versions



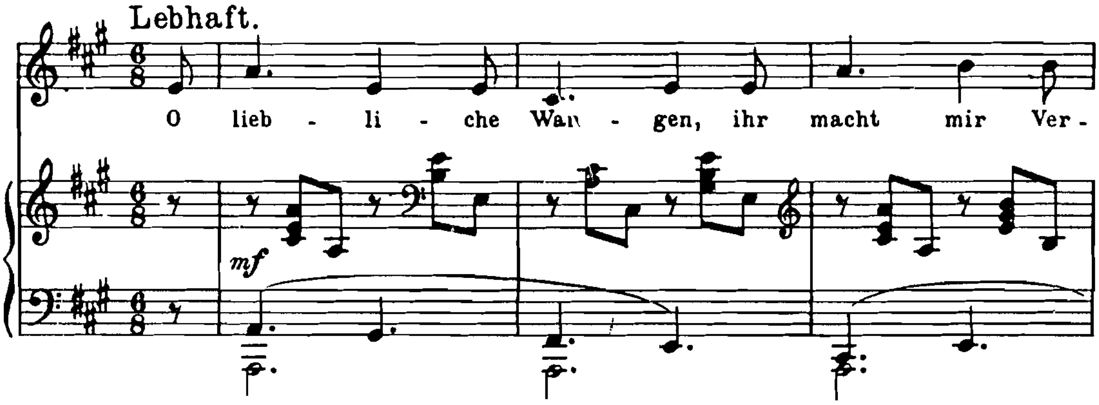
Example V–41. Brahms, *An ein Veilchen*, mm. 1–3
a. Piano Version (a good example for dovetailing)



b. String Version



Example V–42. Brahms, *O liebliche Wangen*, mm. 1–3
a. Piano Version



b. String Version



Repeated chords in the strings have the same effect as the piano version, but are more idiomatic, especially at this fast tempo.

Example V–43. Saint-Saëns, *L'Attente*, mm. 1–3

a. Piano Version



b. String Version



Similar to the previous Brahms excerpt, this accompaniment lends itself much better to repeated notes in the string version.

In this discussion of the string choir, as well as in the ensuing chapters dealing with combinations of strings, winds, then strings, winds, brass, and percussion, culminating in the full orchestra, the taste of the composer is of course the final arbiter. However, proven principles of success may help in the selection process, not only in the choice of instruments and their distribution, but also in regard to the surrounding texture. One may profit greatly by either heeding the old tried and true ways, or, armed with the knowledge of what one is rejecting, by searching for new solutions. The overriding consideration must be the realization that orchestration must serve the structure of a work. It must clarify the form and support the tonal flow by its unique contribution, the element of color.

Suggested string orchestra works and excerpts for additional listening:

Britten, *Serenade for Tenor, Horn and Strings*

Britten, *Dawn* from *Four Sea Interludes* (combination flute-violin), beginning

Vaughn Williams, *Fantasy on a Theme of Thomas Tallis* (large string combinations)
Stravinsky, *Concerto in D*
Grieg, *Holberg Suite*
Diamond, *Rounds for Strings* (contrapuntal writing in last movement)

Pizzicato in foreground and background use:

Grieg, *Anitra's Dance* from *Peer Gynt*
Holst, *St. Paul's Suite*, second movement
Shostakovich, *Symphony No. 9*, first movement (violas, cellos, basses)
Wagner, *Tannhäuser*, Wolfram's address, score p. 716, mm. 452–89
Casella, *Paganiniana*, left-hand pizz., second movement at [65]
Tchaikovsky, *Romeo and Juliet*, pizz. passage, mm. 38–51
Bruckner, *Symphony No. 3*, cello-bass pizz. in third movement

Effective scoring for one or a combination of string instruments negotiating an important melodic idea:

Chausson, *Symphony in B♭* (high violins), third movement, letter Ⓑ
R. Strauss, *Death and Transfiguration* (high violins), pp. 103–104
Rimsky-Korsakoff, *Le Coq d'or Suite* (long viola solo), opening, third movement
Wagner, *Der fliegende Holländer* (violin and viola), Overture, mm. 353–61
Verdi, *Otello*, Act IV at [U] after "Ave Maria"
R. Strauss, *Also Sprach Zarathustra* (divisi double basses), beginning at the fugue
Sibelius, *Symphony No. 1* (double bass solo), third movement, 14 before [K]

Additional contrapuntal writing for strings:

Françaix, *Symphonie d'archets*, first movement
Lutosławksi, *Funeral Music*, beginning
Riegger, *Symphony No. 3*, last movement, pp. 130–33

Some more divisi passages:

Weber, Overture to *Euryanthe* (violins and viola), mm. 129–43
Wagner, Prelude to *Lohengrin*, beginning and end
Debussy, *Nocturne No. 3*, pp. 102–106

Very special string writing with *col legno*, *col legno battute*, harmonics, *jeté*, etc.

Colgrass, *As Quiet As*, second movement

6

The Woodwind Choir (Reed Aerophones)

"The story of the orchestra resembles an old family chronicle, or more exactly, the story of the rivalry between a large number of families. Eventually, they unite for a common aim and the establishment of regular affairs of state."* The woodwind choir is perhaps the most quarrelsome of all the families within the orchestra since it is composed of largely heterogenous instruments. It is even difficult for wind instruments to tune with one another and it takes the finest players to accomplish any kind of balance or blend between these most colorful and diverse orchestra members.

Even the word "woodwinds" is simply a term of convenience rather than an accurate description of this family. While all of the major instruments in the group, with the exception of the saxophones, were, at one time, actually made of wood, this is no longer the case. Flutes are now made of all kinds of metals, even gold, silver, and platinum; and the cheaper clarinets are made of plastic. The saxophones, being a relatively recent invention, have always been made of brass, but shall be classified under the rubric of "woodwinds" since they are related to the group in so many ways. It is interesting to note, however, that a classic text like the Cecil Forsyth's *Orchestration* includes the saxophone in the brass instrument chapter.

Before going any further into the details of construction and categorization of these instruments, it would be wise to look very briefly at the principles on which they function.

Without too much acoustical knowledge, one can state that a body of air will vibrate when set in motion, because it possesses elasticity

*Paul Bekker, The Orchestra (New York: W. W. Norton, 1963), p. 15.

and inertia. The vibrating string communicates only a very small amount of sound. In order to project greater volume, that sound must be amplified by passing through a soundbox. Pipes do not require this kind of an arrangement because the vibrating air column within a conical, or a cylindrical, tube communicates the sound at a desired amplitude directly through an opening in the tube. It is, therefore, imperative for the timbre, amplitude, range, register strength, agility, articulation possibilities, and even versatility, that one know the mode of producing sound for each of the woodwinds and through what kind of tube the air column passes once it is set in motion.

The tube has to have holes, or openings, cut according to exact theoretical requirements, in order to produce all the semitones between the fundamental tone and the first partial. Until the mechanical key system invented by Theobald Boehm (1794–1881) supplanted an earlier primitive mechanism, which compensated for the inadequacy of the hand to cover the holes since they were so far apart, no real advance in the perfection of woodwind instruments was possible. The Boehm system made it relatively simple to produce all the notes on the instruments by interlocking keys which are readily worked by the fingers. This mechanical system has been continually perfected until there are hardly any skips, trills, or tremolos which cannot be performed on any woodwind instrument today.

Keeping this in mind, it is possible to classify the woodwind choir in at least five ways:

1. by families
2. by the kind of reed used
3. by the shape of the pipe
4. by the interval they "overblow"
5. by whether they transpose or not

1. Classification by Families

   a. The Flute Family*: piccolo, flute, alto flute, bass flute
   b. The Oboe Family: oboe, oboe d'amore, English horn, heckelphone, bassoon, contrabassoon
   c. The Clarinet Family: C, D, E♭, B♭, and A clarinets, alto clarinet, bass clarinets, contrabass clarinet, bassett horn
   d. The Saxophone Family: sopranino, soprano, alto, tenor, baritone, and bass saxophones

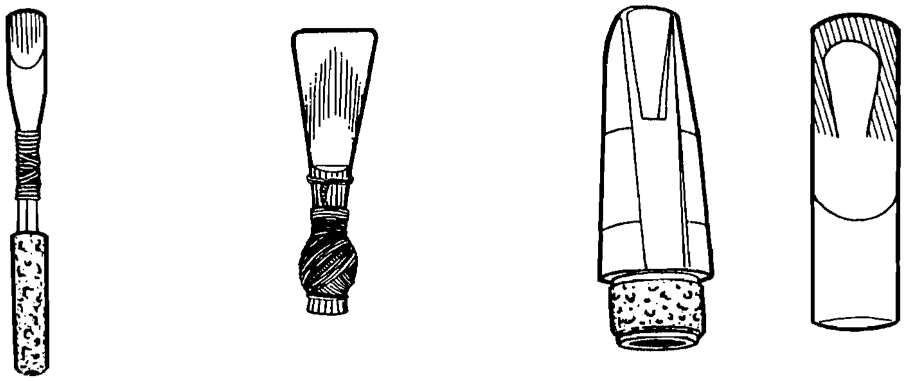
2. Classification by Reeds

In any discussion of reeds or nonreeds, of prime importance is the word *embouchure*. It refers to the method of blowing into the instrument to set the air column in motion directly (flutes) or by the reed

*The Recorder Consort (called the Flageolet Family)—sopranino, soprano, alto, tenor, bass—is not used in the modern symphony orchestra.

mechanism or mouthpiece (all other woodwinds). The pitch variation—in other words, the tuning—is dependent on the embouchure, since intonation is largely controlled by the lips. The pitch can also be slightly modified by manipulating the mouthpiece joint, or, at times, the other joints, thereby changing the length of the instrument. Pulling out the mouthpiece (or *headjoint* on the flute) slightly lengthens the instrument, and therefore lowers the pitch; conversely, pushing it in raises the pitch a bit.

Oboe Reed Bassoon Reed Clarinet Mouthpiece and Reed



   a. Nonreed woodwinds: all flutes plus recorders
   b. Single reeds: all clarinets and saxophones
   c. Double reeds: oboe, oboe d'amore, English horn, heckelphone, bassoon, and contrabassoon
3. Classification by the Shape of the Pipe
   a. Cylindrical tube (essentially, a straight pipe): flutes and clarinets*
      1) Even though the flute is closed at one end, the embouchure hole is so close to the closed end that it is called an open cylindrical pipe.
      2) The clarinet is called a closed cylindrical tube because its mouthpiece closes the tube at one end.
   b. Conical tubes (the pipe is larger at one end than at the other): oboes, English horns, bassoons, and saxophones
4. Classification by Overblowing

Overblowing is the woodwind equivalent of touching a node on a string at the halfway mark, producing the first harmonic. On the wind instrument, this is accomplished by blowing with more force, thereby compelling the vibrating air column to split up fractionally.

* Acousticians are still quibbling about these facts, for neither the flute nor the clarinet is a pure cylindrical shape. The flute is even being classified as a cylindro-conical pipe, but for our purposes, the simpler version suffices.

a. All conical pipe instruments and flutes overblow the octave.
b. All clarinets overblow the twelfth.

5. Classification by Transposition
   a. Nontransposing woodwinds: flute, oboe, and bassoon
   b. Transposing woodwinds: piccolo, alto flute, bass flute, oboe d'amore, English horn, heckelphone, D, E♭, B♭, A clarinets, alto clarinet, bass clarinet, contrabass clarinet, all saxophones, contrabassoon

This category may be further broken down as follows:

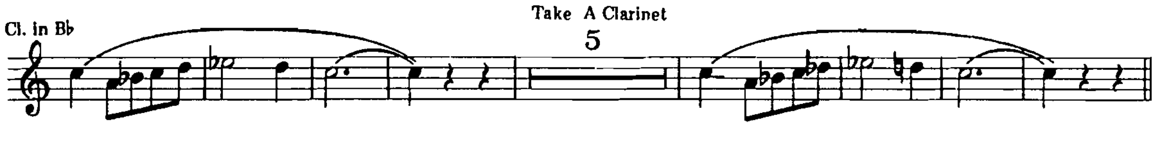
1) Those instruments that never change their interval of transposition:
   Piccolo sounds an octave higher than written.
   Bass flute sounds an octave lower than written.
   Contrabassoon sounds an octave lower than written.
   The oboe d'amore in A sounds a third lower than written.
   English horn in F sounds a fifth lower than written.
   Alto flute in G sounds a fourth lower than written.
   Alto Clarinet in E♭ sounds a major sixth lower than written.
   Bass clarinet in B♭ (notated in treble clef) sounds a major ninth lower than written, or if notated in the bass clef a major second lower than written.
   Contrabass clarinet in E♭ sounds an octave and a major sixth lower than written.
   Soprano saxophone in B♭ sounds a major second lower than written.
   Alto saxophone in E♭ sounds a major sixth lower than written.
   Tenor saxophone in B♭ sounds a major ninth lower than written.
   Baritone saxophone in E♭ sounds one octave and a major sixth lower than written
   Bass saxophone in B♭ sounds two octaves and a major second lower than written.

2) Those instruments that can change their interval of transposition from work to work. (Therefore, the interval of transposition must be clearly marked in the score and in the individual parts.): all regular clarinets (excluding alto, bass, and contrabass, although in some nineteenth-century scores bass clarinets are sometimes in E♭; but in modern orchestral practice this is seldom the case).

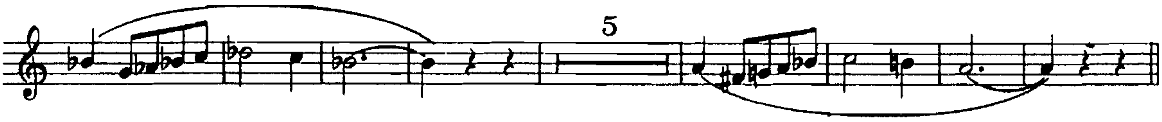
THE PRINCIPLE OF TRANSPOSITION

A transposing instrument produces pitches that sound different from what is notated in the score. In other words, it is up to the composer or orchestrator to transpose the part so that the player may simply read it off and finger it naturally on his instrument, but produce the pitches that the music demands.

Example VI–1. Written Part

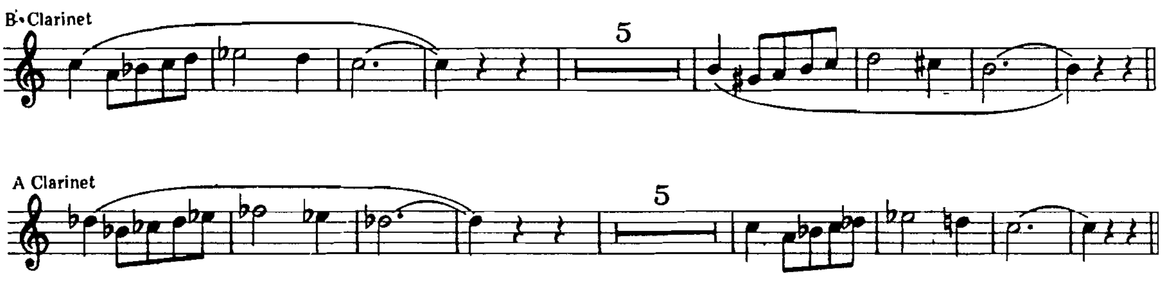


Example VI–2. Sounding Pitches



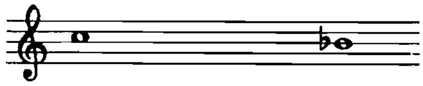
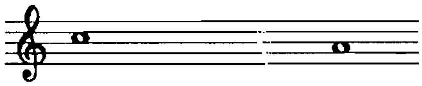
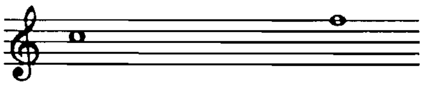
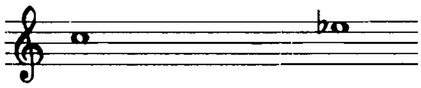
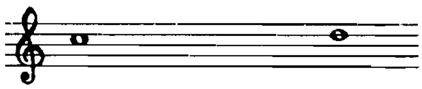
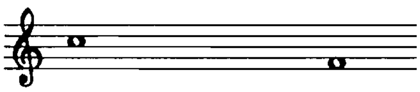
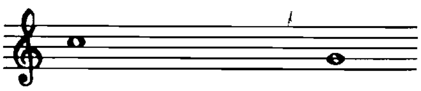
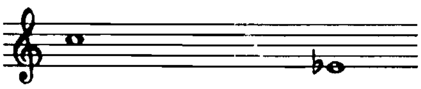
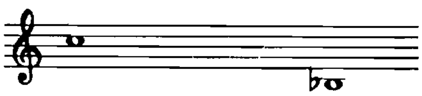
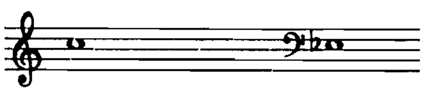
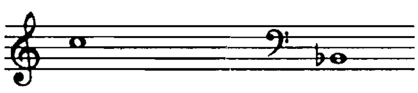
Notice: The composer writes the same notes for both B♭ and A clarinet, realizing that the two phrases will sound different, since they are performed on two instruments which transpose at a different interval. Also, the composer has provided a long enough rest for the clarinetist to change his instrument. If he had wanted the clarinetist to play both phrases on the same clarinet, the music would have to read:

Example VI–3. Written Part



The major reason instruments at different transpositions were used was to avoid too many accidentals before the mechanical systems on these instruments were perfected. Today, switching clarinets, especially within a single work, is quite rare. Copland, however, uses the two clarinets alternately in *Appalachian Spring.* *Spring.*

The basic rule for all transposing instruments is that the written C (the fundamental) will sound the pitch by which the particular instrument is designated.

	Written Pitch Sounding Pitch	
Clarinet in B♭, Soprano sax in B♭		a major second below the written pitch
Clarinet in A		a minor third below the written pitch
Sopranino sax in F		a perfect fourth above the written pitch
Clarinet in E♭		a minor third above the written pitch
Clarinet in D		a major second above the written pitch
English horn, Basset horn, both in F		a perfect fifth below the written pitch
Alto flute in G		a perfect fourth below the written pitch
Alto clarinet, Alto sax, both in E♭		a major sixth below the written pitch
Tenor sax, Bass Clarinet*, both in B♭		a major ninth below the written pitch
Baritone sax in E♭		a major thirteenth below the written pitch
Contrabass clarinet, Bass sax, both in B♭		two octaves and a major second below the written pitch

* If the bass clarinet is written in the bass clef, it sounds only a major second below the notated pitch. If, by chance, one encounters a bass clarinet in A, it is good to know that it sounds a minor tenth below the notated pitch if written in the treble clef, or a minor third below if written in the bass clef.

Octave transposing woodwinds: The piccolo sounds an octave higher than written; the contrabassoon sounds an octave lower than written.
In order to *sound* C major, the signature:

for an instrument in B♭ must be D major.
for an instrument in A must be E♭ major.
for an instrument in E♭ must be A major.
for an instrument in D must be B♭ major.
for an instrument in F must be G major.

The decision to use a clarinet in A, B♭, D, or E♭ is usually based on the key of the work. Works in flat keys usually call for B♭ clarinets and E♭ piccolo clarinets, while those in sharp keys are best served by A clarinets and D piccolo clarinets. As has been pointed out above, today when our tonal schemes are no longer rigid or predictable, this consideration is no longer valid, and the composer is free to use either set of instruments. The larger (A, D) clarinets have a slightly more luscious sound, but the difference is hardly discernible. As a matter of fact, the irrelevance of the key relationship has existed to a greater or lesser degree since the advent of chromaticism in the latter half of the nineteenth century. With English horns, saxophones, alto and bass flutes, and, of course, piccolos and contrabassoons, the transpositions are absolute and unchanging, as we have seen.

As a matter of convenience in memorizing these transpositions, it is helpful to note that all non-octave transposing woodwinds transpose down, with the exceptions of the piccolo clarinets in D and E♭, and the sopranino sax in F. Another useful hint is that all instruments designated tenor, baritone, or bass automatically add an octave, or two octaves in some cases, to their transposition, if notated in the treble clef.

GENERAL OBSERVATIONS

All of the general statements that follow will be discussed in greater detail in the sections dealing with each of the instruments.

Intensity and volume vary with each instrument according to the range and particular register in which the passage appears. Intonation, dynamics, and in some instances articulation, trills, and versatility are much harder to control in extreme registers than in the middle ranges of all of the instruments. This is more true of the highest than of the lowest extreme pitches. For example, the flute and piccolo are very weak in volume in the first octave of their register, while the oboe and bassoon should not be called upon to perform

pianissimo in the lower fifth of their range. On the other hand, it is an outstanding, if often neglected, quality of the clarinet that it possesses a full dynamic range in all its registers from top to bottom.

All wind instruments are relatively free of problems, as long as the composer or orchestrator uses his knowledge of the possibilities and improbabilities* of the technique. Careful consideration should be given to the limitations placed on the player in certain registers of an instrument. In addition, one should not ask nonprofessional players to attempt runs or leaps that are too challenging for them. It is a fact, for instance, that breath control on the oboe is totally different from that on all other woodwinds. The player needs less breath and often has to exhale instead of inhale. Therefore, he is able to play for longer stretches than any other wind player. An analogy might be made to the camel's capacity to store water more efficiently than any other animal, slowly rationing its supply to satisfy its thirst even on long desert trips.

VIBRATO

Just as the string tone is enriched by oscillating a finger on the string to achieve a vibrato, so the wind and, for that matter, the brass instrument's tone is enhanced by its use. Vibrato is produced by engendering a pulsation of the air column more or less rapidly in one of four different ways: 1) by the lips and jaw (normal for clarinet and saxophone, seldom for oboe and bassoon); 2) by the throat muscles (sometimes for flute); 3) by the abdominal muscles (normal for oboe and bassoon); or 4) by a combination of the throat and abdominal muscles (normal for flute). The first way is dangerous, for it may upset the embouchure; therefore, the other methods are usually preferred.

One does not have to specify the use of vibrato in a score, for any good wind player will naturally color a pitch with vibrato to make it rich and round. The width of the vibrato is a matter of style and good taste and can be adjusted by a professional player. However, if a composer wishes to have no vibrato for a certain passage, he must indicate this by marking the score *senza vibrato, nonvibrato,* or as Copland does, "white tone." When the player is to return to a normal way of playing, the indication *con vibrato* or "normal" (*normale*) should appear.

Here is a famous "white tone" passage from Copland's *Appalachian Spring:*

*This word is better than "impossibilities," for today, players are able to accomplish feats on these instruments that only yesterday were thought impossible; multiphonics or rotary breathing, for example, if adopted by all players, could change the entire outlook on phrasing.

Example VI–4. Copland, *Appalachian Spring*, mm. 1–4



ARTICULATION, TONGUING, AND PHRASING

Articulation for woodwinds is called *tonguing.* A tone on a woodwind instrument is initiated by the sudden drawing back of the tongue as if one were saying the syllable "tu." There are instances, depending on the instrument and considerations of register and dynamic, in which the syllable "du" is used instead. The tone is stopped, either by the tongue's returning to its original position, hitting the side of the reed, or by cutting off the supply of breath. When there are no slurs marked in the music, the notes are tongued or articulated separately. When slurs are present, the player performs all the pitches under or within the slur, on one breath (like the string player on one bow; however, a wind player is able to play many more notes on one breath than a string player can play on one bow due to the limitations of bow length). This on-one-breath articulation is called legato playing, though not all on-one-breath playing on wind instruments is necessarily legato.

Example VI–5. Beethoven, *Symphony No. 8,* first movement, mm. 1–4



The first few measures of Beethoven's *Eighth Symphony* would sound very different in Example VI–5 (b) than (a) because the legato playing called for in (b) gives a much smoother effect than the more spritely, mostly tongued example (a).

There are variations in straight tonguing which can be called forth by correct notation:

1. When a dot is placed over a pitch, the player will articulate a staccato note, and there will be a natural separation between the notes.

Example VI–6. Staccato



2. In some instances, slurs are placed over repeated notes which have dots or dashes over them. This means "soft tonguing." With dots over the notes under the slur, the articulation is slightly "harder" than when dashes separate the notes. The effect is similar to slurred staccato and *louré* on strings which are played on one bow. Here they are performed on one breath.

Example VI–7. Soft-tonguing

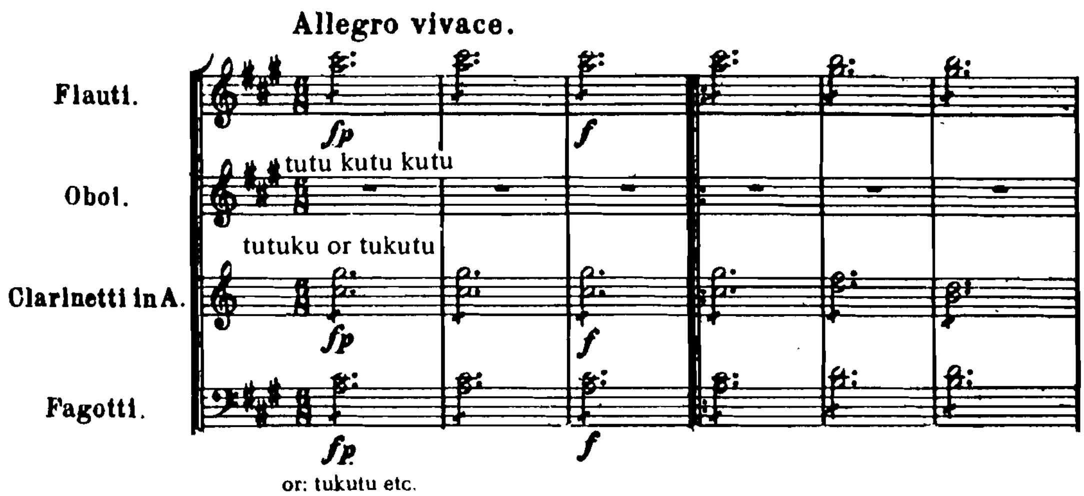


3. In very fast passages, the player will use "double-tonguing" and, especially in fast triplet passages, "triple-tonguing." The syllables "spoken" at the time of articulation are then:

Example VI–8. Double-tonguing



Example VI–9. Triple-tonguing in Mendelssohn, *Symphony No. 4*, first movement, mm. 1–6

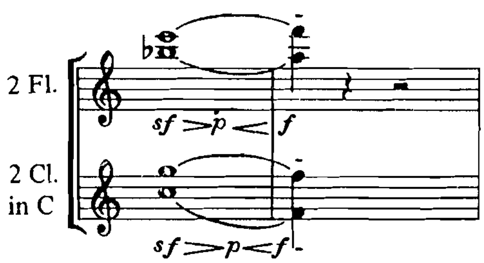


4. We have already mentioned the technique of tone release on a woodwind instrument, in which the tongue returns to its original position. But there is a special effect which, though not exclusive to the woodwinds, is best for these instruments. It is the *sfp*, *sf* > p < *f*; or vice-versa. These "envelopes" can be executed by a strong attack after which the volume is decreased and may be increased again.

Example VI–10. Beethoven, *Symphony No. 1*, first movement, mm. 1–4



Example VI–11

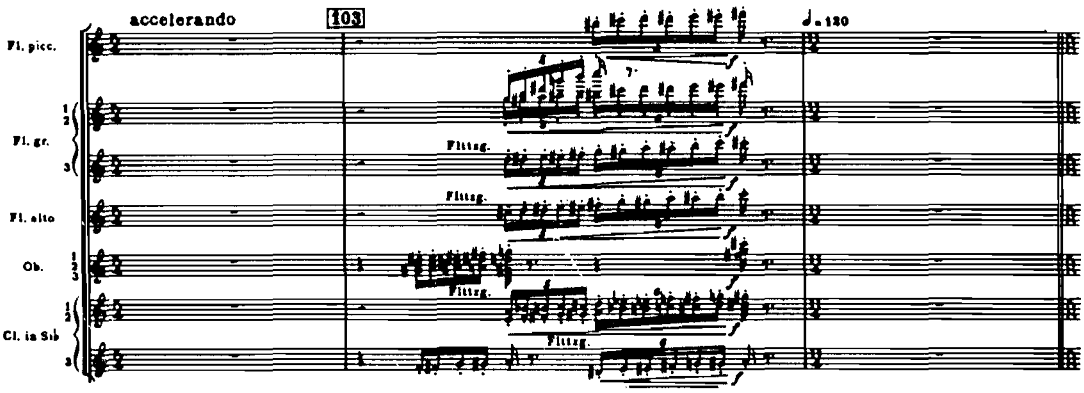


FLUTTERTONGUE

This is a special effect, not unlike the unmeasured tremolo for strings in notation and purpose. Of course, the sound is different; it is like a whir. It can be produced either by a rapid roll or fluttering of the tongue, or by a prolonged gutteral "r" rolled in the throat. This is relatively easy to execute on all flutes, clarinets, and saxophones, but more difficult on oboes and bassoons, even though it is seen in twentieth-century literature quite often. Fluttertonguing may be required on long notes, or an entire passage (fast or slow) may be played fluttertongue. The parts must be marked like unmeasured tremolo with three slashes through the stems or above whole notes, and

the word "fluttertongue"—more commonly the German word *Flatterzunge*—must be written in the score above the passage. The abbreviation *Flt.* is certainly acceptable.

Example VI–12. Stravinsky, *Le sacre du printemps*, "Circles mysterieux des adolescentes," 1 m. before [103] – 1 m. after



THE WOODWIND SECTION OF A SYMPHONY ORCHESTRA

The instruments are listed here in the order in which they appear on the score page.

1. Classical orchestra,* up to and including early Beethoven:
   2 Flutes
   2 Oboes
   2 Clarinets (the transposition determined by the key of the work)
   2 Bassoons
2. The orchestra after Beethoven:
   Piccolo
   2 Flutes
   2 Oboes
   English Horn
   2 Clarinets
   Bass Clarinet
   2 Bassoons
   Contrabassoon
3. The large orchestra of the late nineteenth and twentieth century:

*In some early Haydn symphonies the English horn was used, but that was an anomaly; also, piccolo was used in some stage works before Beethoven. However, the norm is the orchestra as seen here.

Piccolo (sometimes 2 Piccolos or one doubling on Alto Flute)
3 Flutes
3 Oboes
English Horn
C, D, or E♭ Clarinet
2 or 3 Clarinets in B♭ or A
Bass Clarinet (some scores ask for 2 Bass Clarinets or Bassett Horn)
3 Bassoons
Contrabassoon

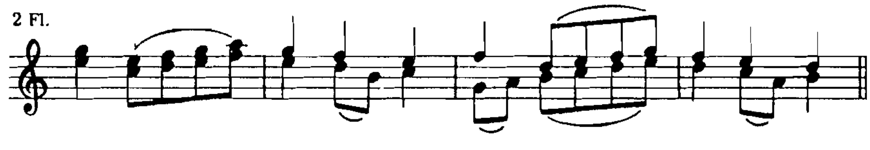
When saxophones are used, they appear in the following sequence: soprano, alto, tenor, baritone, bass, and are placed between the clarinets and the bassoons.

ORGANIZING THE WOODWINDS ON THE SCORE PAGE

In order to create the most effective and legible score, the following rules should be observed:

1. The first and second parts of identical instruments (2 flutes, 2 oboes, etc.) are usually written on the same staff. The exception to this rule occurs when the difference in rhythm and general complexity in the two parts would make this practice confusing. In those cases, a separate staff should be used for the second player. In case there are three identical instruments, the first and second should be on one staff, the third on a separate one. If the second and third parts are rhythmically and melodically more akin to each other than the first and second, the first should appear alone on one staff, while the second and third are combined on another.

Example VI–13



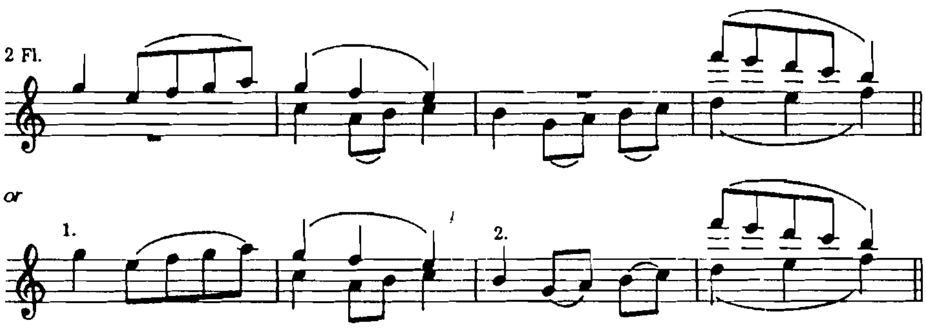
2. If both first and second players are to play in unison, the part must be marked *a2*. In case of three players in unison, it should be marked *a3*.

Example VI–14. Bartók, *Concerto for Orchestra*, first movement, mm. 230–37



3. If the first or second player is to play alone, one can either supply the appropriate rests in the score, or mark the part 1., 1°, or 2., 2°.

Example VI–15



4. Do not use the term *divisi*, for that is a string designation which is not applicable to woodwinds or brass, since each player is given a separate part. Certain woodwind passages are designated as *solo* to emphasize the fact that a particular line or melody is the most important event occurring at that moment. In the case of Example VI–16, the clarinet "solo" is the only thing audible at the beginning of the work.

MUTING

There are no mutes for any of the woodwind instruments, yet composers have asked for muted sounds. Wind players usually accommodate by lightly stuffing a cloth or handkerchief into the opening, or by covering the open end of the bell with their hands. Obviously, this is altogether impossible for the flute.

MULTIPHONICS AND SPECIAL EFFECTS

For the past twenty years, many special techniques have been developed for woodwind instruments. The most far-reaching is the idea of multiphonics, meaning the simultaneous sounding of more than one note. This is still a subject of great controversy because not everyone can perform these, and some of the "double-stops" can be produced only on certain models of instruments. Even though some multiphonics have been called for in newer orchestral and band literature, the greater demand has been in solo and chamber music. Therefore, this technique will be discussed briefly in the sections reserved for the in-depth investigation of each instrument.

Another rather recent innovation is the use of microtones and special shadings of a pitch. This is more common for orchestral winds, but, similar to multiphonics, is a very volatile and risky subject. It is best left for personal consultation with individual players, many of whom have trick fingerings by which they produce the desired microtones or shadings. Some examples of this will appear in the individual instrumental sections.

Glissandi are most successful on the clarinet and on the saxophone, but only in an upward direction. The downward glissando is effective only between neighboring pitches. Flutes, oboes, and bassoons, as well as clarinets, can depress a pitch or raise it slightly by changing their embouchure. This sounds like the slight glissando, but should not be used between pitches greater than a second.

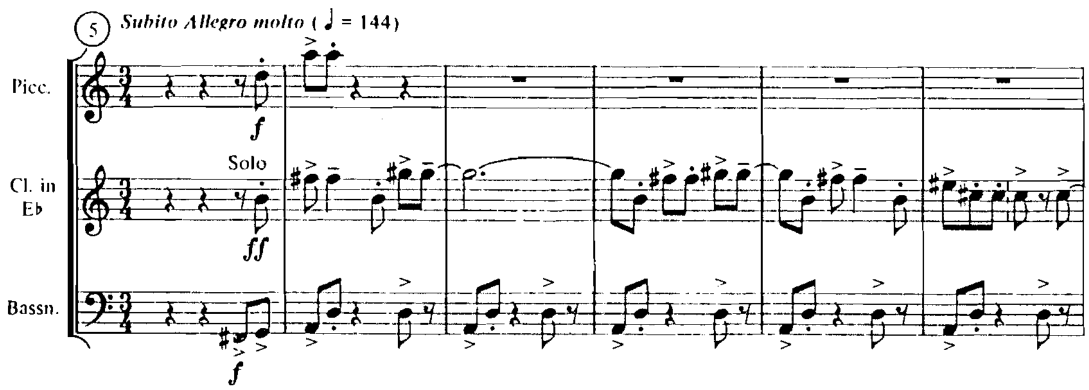
Example VI-16. Gershwin, *Rhapsody in Blue*, opening.



See also Crumb, *Echoes of Time and the River*, second movement, mm. 12–13.

Slap tonguing, a special effect from jazz, is most effective on clarinets and saxophones, but also possible on the flute. It produces a perky, snappy, overarticulated attack.

Example VI–17. Copland, *Music for the Theater*, [5]–[6]





Key clicking has been used quite extensively in the last thirty years or so. It can be employed simply as a percussive, rhythmic effect; or actual pitches can be heard if the keys are slapped down hard without any air being blown through the instrument. In the flute (up close especially), one will be able to hear different pitches, much like those obtained by putting down one's fingers hard on the strings without using the bow. Once again, because of acoustical considerations, one must not expect much of this practice in orchestral music beyond a pure, soft, percussive effect.

The converse technique is also demanded at times. The composer may ask the wind players to blow through the instrument without producing a tone—in other words, simply producing the sound of blowing air through a pipe.

Example VI–18. Claire Polin, *The Death of Procris*, II, mm. 32–36



Whistletones are sometimes required of the flutist and are very effective. Instead of blowing into the mouthpiece, the flutist turns the instrument slightly away from the face and blows across the mouthpiece while fingering the pitches. This can cause a shriek, such as those required by Sydney Hodkinson in *Interplay* and Donald Erb in his *Concerto for Solo Percussionist*.

In all these cases, as with the special string effects, it is better to write out one's intentions in the score and parts, since no universally standardized notation exists as yet.*

* For the clearest notation of these effects, check Kurt Stone, *Music Notation in the 20th Century*.

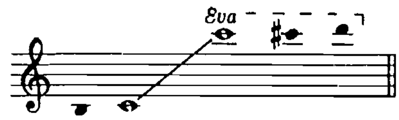
7

Individual Woodwinds

FLUTE

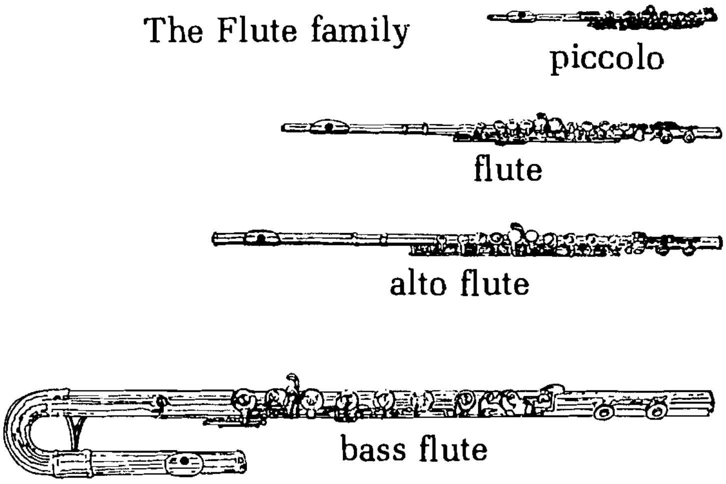
Flauto (It.), *Flûte* (Fr.), *Flöte* (Ger.)

Example VII–1. Range



The flute is the only nonreed instrument in the woodwind choir, and though all the other instruments have great agility and sensitivity, none can equal the flute in these attributes. Before looking at its range in detail and describing the almost limitless possibilities to which the flute lends itself, a general statement which should be kept in mind throughout the study of this choir of the orchestra is in order.

Each woodwind instrument has a most distinctive sound, which makes it invaluable as a presenter of melodic material. In this role, each one takes on a personality, so that not only the instrument *per se* but every segment of each instrument's range (register) is "typecast" by many composers. A great orchestrator tries to assign a part to each instrument which sounds best on it and which, psychologically as well as musically, could not be performed on any other instrument. As we examine each one of the woodwinds, we must steadfastly keep that goal in mind. Further, it is most important, in

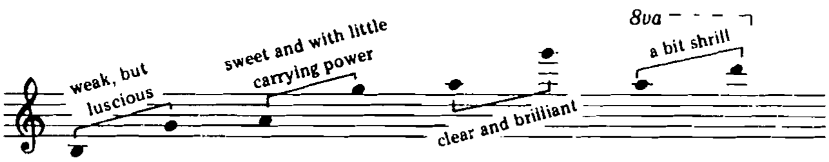




Bonita Boyd, flute

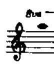
this as well as in the subsequent chapter, to concentrate on the role each instrument plays in the context of an orchestra. If a certain register is described as weak, it does not mean that one could not hear it in a solo passage or as part of a woodwind quintet. The designation of a section of its range as weak is a precautionary statement to a composer or orchestrator to be sure not to "cover" the instrument, for it is physically impossible for the player to extract more volume out of his instrument in that register. Similarly, some extreme high registers will be called shrill, and in most cases the performer can only play extremely loud. Too often these registral peculiarities are ignored by inexperienced orchestrators, who blame the players if the results do not coincide with their intentions, though they had been forewarned. In this spirit, then, let us examine the range and registers of the flute, as we shall every one of the woodwind and brass instruments.

Example VII–2. Registers



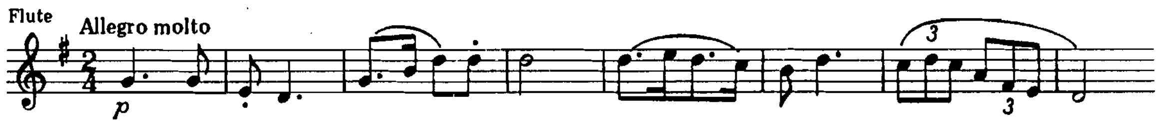
Most professional flutes made in America have a B-foot, meaning that they are able to play the low B♮. European flutists are opposed to a B-foot and feel that it takes away some brilliance from the instrument.* On the upper end, the modern flute does go beyond the high

* Some flutists argue that a B-foot makes it easier to play the low C and strengthens that rather common note; also, the B-foot gives a slightly greater resonance or depth to the flute.

C  to the C# and D, but be aware that above the A  all pitches are difficult to produce, and extreme caution must be used in approaching them. The best approach is by scale. To point out the limitations, then, one must say that the highest fourth and the lowest fourth with all intervening chromatic pitches are most problematical, especially for the nonprofessional.

Here are two examples of the beautiful lowest part of the register, but notice how the composers are careful to let the flute come through by doing little with the other instruments:

Example VII–3. Dvořák, *New World Symphony*, first movement, mm. 149–56.



Example VII–4. Brahms, *Symphony No. 4*, fourth movement, mm. 97–104.



See also Debussy, *Iberia*, first movement, 4 measures before [33]; and second movement, mm. 5–9 after [46].

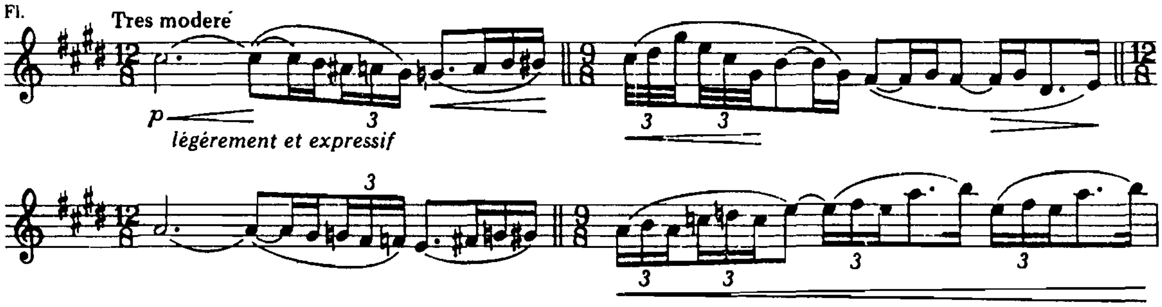
The Brahms example affords us a wonderful opportunity to observe the profound changes of register in the flute and demonstrates that the performer does not have to struggle to be heard even in his lowest register thanks to the thin-textured accompaniment.

Next are some examples of the most nondescript part of the flute's range—and yet, because of the care the composer has given the accompaniment, there are no problems for the performer, and the melody is perceived with a great deal of delicacy and vibrance.

Example VII–5. Tchaikovsky, *Piano Concerto No. 1*, second movement, mm. 5–12



Example VII–6. Debussy, *Prélude à l'après-midi d'un faune*, mm. 21–24



The upper range of the flute, which possesses such commanding brilliance, can best be illustrated by these two examples, which also show its agility. Remember that all separately notated pitches are tongued, while slurred ones are played *legato* (on one breath).

Example VII–7. Rossini, Overture to *William Tell*, mm. 209–24



Example VII–8. Bizet, *Carmen*, Prelude to Act III, mm. 1–13

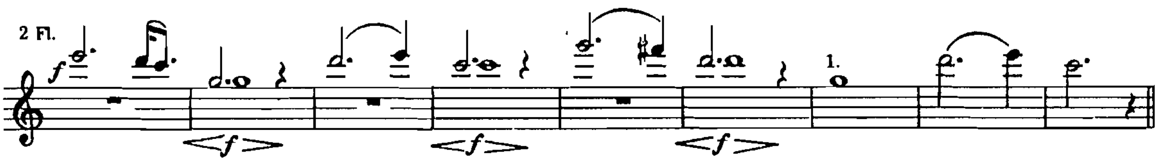


See also:

Hindemith, *Symphonic Metamorphoses*, third movement, mm. 31–48
Beethoven, *Leonore Overture No. 3*, mm. 328–52

The flute is also very effective and intense in slower, long-note melodies. It is important to remember that the flute requires a great deal of breath. For best results, therefore, it is important to give the flutist time to rest after especially difficult or sustained passages.

Example VII–9. Brahms, *Symphony No. 1*, fourth movement, mm. 38–46



In order to avoid any problems in sustaining the long notes in mm. 2–4 and m. 6 (see Example VII–9), Brahms gave the second flute the task of holding the note while executing the crescendo-diminuendo in those measures, so that the first flute may breathe without diminishing the intensity of the passage. The two parts must be dovetailed with great care to preserve the illusion of a single flute performing the passage.

Example VII–10. Piston, *The Incredible Flutist*, [E], mm. 1–18





See also Shostakovich, *Symphony No. 5*, first movement, 1 measure after [39] to [41].

Double-tonguing and triple-tonguing have already been discussed in the previous chapter. The following passages may be played using either one of these techniques or simply with single-tonguing.

Example VII–11. Mendelssohn, *Symphony No. 4*, fourth movement, mm. 6–19 (triple-tonguing)



Example VII–12. Rimsky-Korsakov, *Capriccio espagnol*, mm. 6–11 (double-tonguing)



See also:

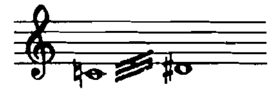
Mozart, Overture to *Le Nozze di Figaro*, mm. 276–82 (double-tonguing)
Strauss, *Don Juan*, mm. 179–83 (triple-tonguing)
Debussy, *La Mer*, 2 measures before 25 to 25 (triple-tonguing)

Trills and tremolos are also very common and successful on the flute. However, some are difficult, if not altogether impossible, and should be avoided:

Example VII–13



and the tremolo



All tremolos from and to low B♮ are weak and should not be used.

Some flutes have an added C♯ trill key to facilitate the execution of these trills. Further, all trills above high G are difficult, although possible. For the best results, do not write a tremolo which has an interval of more than a perfect fifth in the lowest octave. In the higher registers, a safe limit is a perfect fourth.

Harmonics

All the pitches above the second open C♯ on the flutes are overblown harmonics. However, in order to get a special pale or white sound, a composer may ask the flutist to play harmonics. The notational sign is the same as for strings; a small circle above the note. The pitch of a harmonic will sound exactly as it is notated. The player must finger the pitch an octave (or in some cases another partial) below the notated pitch and then overblow to sound the desired note.

Example VII–14. Ravel, *Daphnis et Chloé*, Nocturne, mm. 5–11



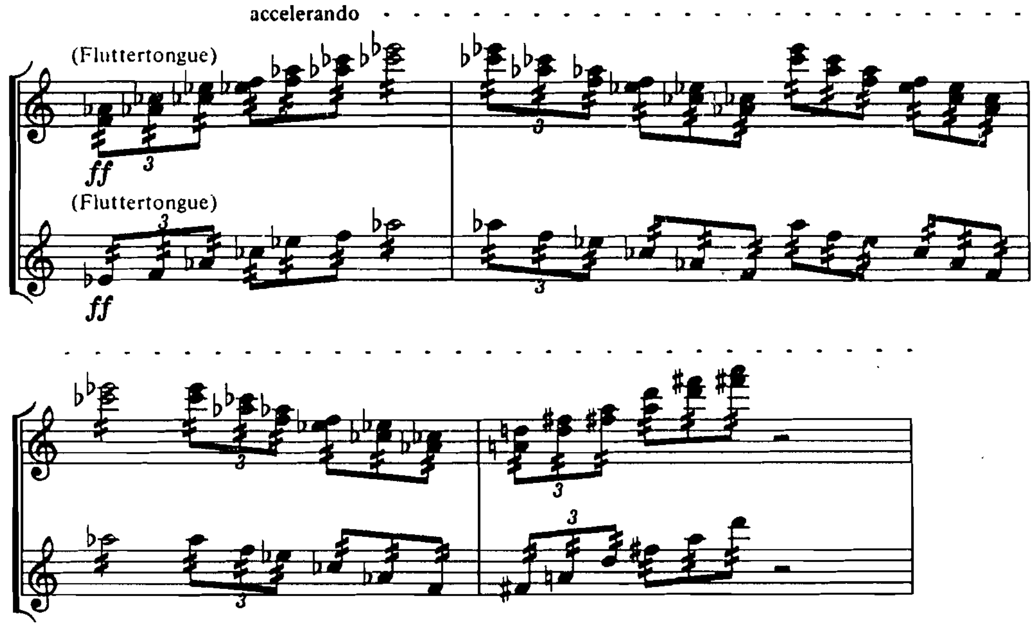
Example VII–15. Ravel, *Daphnis et Chloé*, 49, mm. 1–2.



Coloristic Effects

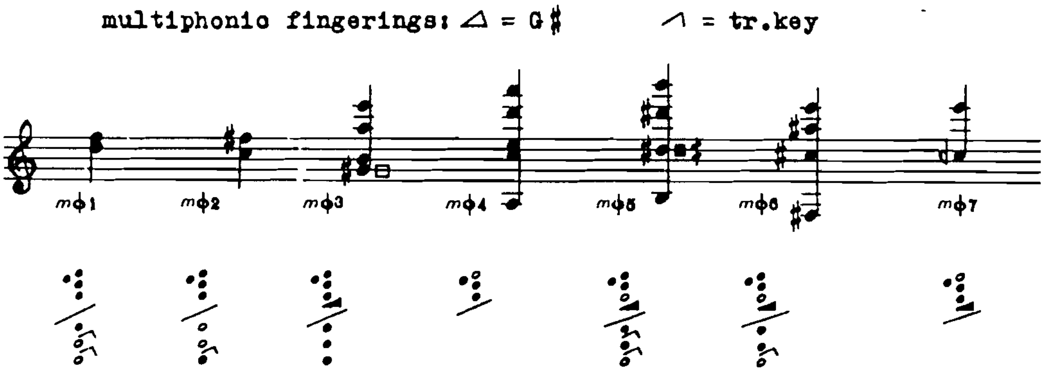
In the previous chapter, fluttertongue, multiphonics, microtones, keyclicks, and other coloristic effects were described. The flute is able to execute all these techniques quite readily.

Example VII–16. Strauss, *Salome*, [41], mm. 1–4



Since these have proliferated in the latter half of the twentieth century, we shall indicate one example of some of the effects here and give a list of some additional places where these may be found in the literature.

Example VII–17. Claire Polin, *The Death of Procris*



See also:

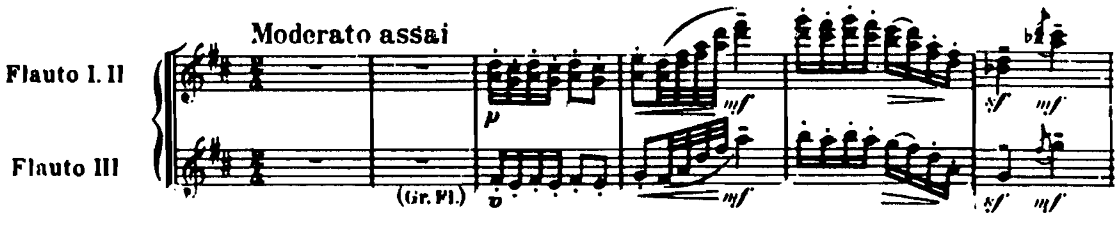
A. Gilbert, *The Incredible Flute Music*
B. Jolas, *Fusain*
Berio, *Sequenza for Flute*

Multiple Flutes

During the Classical period, composers vacillated in the number of flutes they employed in each work. Haydn usually used two, but felt the need for three in his *Creation*. Mozart sometimes used only one, as did Schubert in his *Fifth Symphony*. After Beethoven two flutes in almost every orchestral work was the rule. Sometimes the second flute doubled on piccolo (in Rossini especially); other times two independent flutes plus a piccolo were used. Three flutes became the standard complement of most orchestras in the middle of the nineteenth century, and a fourth and even a fifth member of the flute section playing two piccolos or one piccolo and one alto flute have been used.

These multiple flutes either double at the octave or the unison; are scored in parallel intervals; play antiphonally one with the other; relieve one another in long, fast, or sustained passages; or have completely independent parts. Some examples of multiple flute passages:

Example VII–18. Tchaikovsky, *Nutcracker Suite*, "Dance of the Toy Flutes," mm. 1–6. Parallel flute parts.



Example VII–19. Ravel, *Daphnis et Chloé* at 165. Independent and parallel flute parts.



See also:

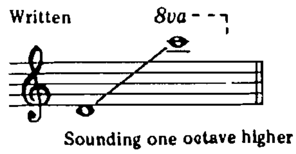
Bach, *Cantata No. 106*, Sonatina (2 flutes)
Stravinsky, *Petrushka*, m. 5 after [62] to [63] (2 flutes)
Mendelssohn, *A Midsummer Night's Dream*, Scherzo, mm. 1–8 (2 flutes)
Stravinsky, *Fireworks*, mm. 1–12 (2 flutes, piccolo)
Chabrier, *España*, mm. 78–82 (2 flutes)
Debussy, *Nocturnes: Fêtes*, mm. 48–50 (3 flutes)

The flute and its upper and lower auxiliaries are most successful doublers of other instruments, and coupling is most effective. These problems will be discussed in the chapter on woodwind scoring.

PICCOLO

Ottavino, Flauto piccolo (It.), *Petite flûte* (Fr.), *Kleine Flöte* (Ger.)

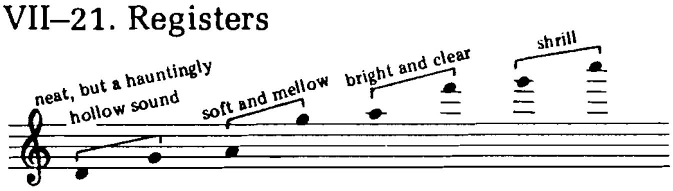
Example VII–20. Range



Each of the four fundamental woodwind instruments—flute, oboe, clarinet, and bassoon—has at least one auxiliary instrument which extends its range and, in many cases, provides intensified coloristic effects at both ends of the registeral spectrum. In the modern orchestra, these instruments are no longer considered auxiliary, but are rather full-fledged extensions of the principal woodwinds, used as a matter of course. The instrument that extends the flute range one whole octave upward is the piccolo. Because, in so doing, it extends the range of the entire orchestra, it has become especially popular in twentieth-century scores. It works on the same principle and has the same versatility and agility as the flute.

The piccolo has always been a D instrument, and there are no models that are able to play any pitches below that note. Some military bands still use the outmoded D♭ piccolo, but it is exceedingly rare.

Example VII–21. Registers



Like the flute, the piccolo can only be used effectively in its first octave if there is not much else going on in the orchestra to drown out its haunting, hollow, but very soft quality.

Above the fourth-line D, the piccolo is very commanding, as can be seen in the following examples:

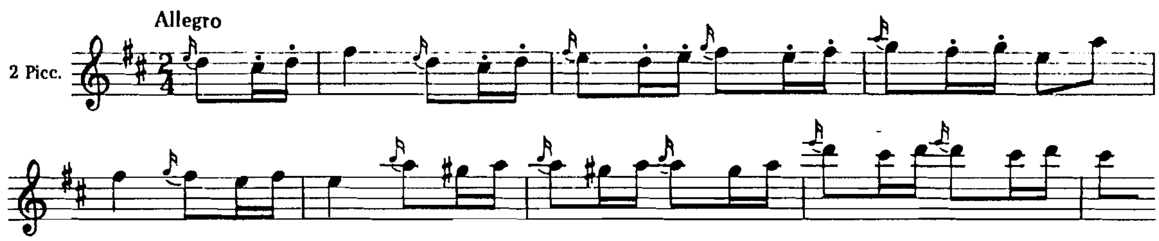
Example VII–22. Mozart, *Die Zauberflöte,* Act II, "Alles fühlt der Liebe Freuden," mm. 5–9



Example VII–23. Prokofiev, *Lieutenant Kijé,* I, mm. 9–17



Example VII–24. Gluck: *Iphigénie en Tauride,* Act I, scene 3, mm. 1–9



See also:

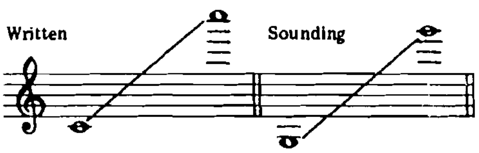
Kodály, *Háry János Suite,* second movement, mm. 5–15
Debussy, *Iberia,* [33], mm. 1–6
Shostakovich, *Symphony No. 15,* end of first movement
Shostakovich, *Symphony No. 6,* second movement, [51] to [53]
Stravinsky, *Petrushka,* mm. 9–4 before [17]
Stravinsky, *Petrushka,* mm. 11–17 after [42] (2 piccolos and 3 flutes)
Smetana, Overture to *The Bartered Bride,* mm. 427–48

The piccolo sounds very piercing in its upper notes. In these contexts that is what is desired; it is supposed to resemble a whistle. Be careful not to overuse the instrument in its extreme upper register, for the sound becomes very tiresome and it is very exhausting for the player.

ALTO FLUTE

Flauto contralto (It.), *Flûte en sol* (Fr.), *Altflöte* (Ger.)

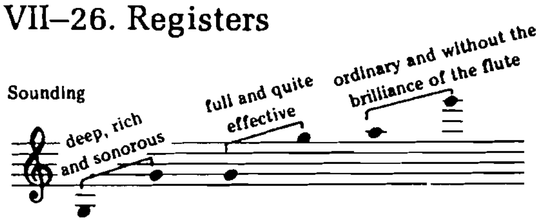
Example VII–25. Range



The alto flute is the first extension of the flute family downward, and by now has become an accepted member of the symphony orchestra, although not an overwhelming number of scores ask for it. Its tube is quite a bit thicker and longer than that of the regular flute, and it is a transposing instrument. The mechanism and the fingering are the same as on the C flute, but the alto flute is in G, and therefore sounds a perfect fourth lower than written. In many orchestration texts, as well as some scores, this is called the "bass flute," but that is an erroneous designation, as will be seen in the next portion of this chapter where the real bass flute is briefly discussed.

The alto flute came into prominence in the last decade of the nineteenth century and was made popular by the scores of Stravinsky and Ravel in particular.

Example VII–26. Registers



Even though all flute techniques can be realized on the alto instrument, one must remember that because of its larger size and the greater diameter of its tube, it requires more breath than the ordinary flute. Its low notes are much richer and have more carrying power, but the upper register is quite ordinary and without much brilliance. Here is a case of "personality" once again. If one elects to use an alto

flute, one should certainly exploit its lower register, for the regular flute and the piccolo are capable of covering the upper part of the register most adequately.

Here are some excellent examples in which the alto flute has been used to its best advantage as a solo instrument as well as in combination with other flutes.

Example VII–27. Holst, *The Planets, Saturn*, mm. 53–63



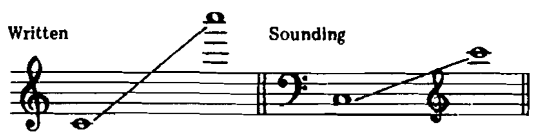
Example VII–28. Stravinsky, *Le Sacre du printemps*, "Rondes printanieres," mm. 55–62



BASS FLUTE

Flauto basso (It.), *Flûte bass* (Fr.), *Bassflöte* (Ger.)

Example VII–29 Range



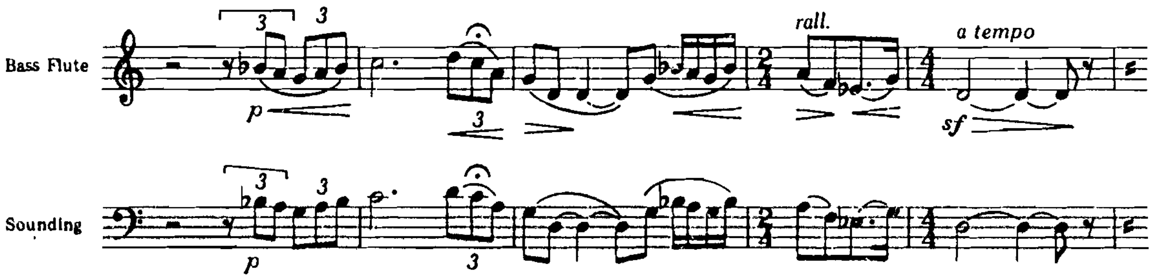
Ever since the middle of the nineteenth century, flutists and flute builders have acknowledged the need for a bass instrument in the family. Theobald Boehm was the first to try constructing one, but the result was too unwieldy. It was not until 1930 that a completely practical instrument was perfected, by the flute makers Rudall, Carte and Company, based on the Boehm mechanical system. The upper part of the instrument is coiled below the headjoint, and an additional bend positions the main tube across the right side of the player's body. Further, there is an adjustable light metal bracket

which allows the player to balance the instrument on his right thigh when sitting down. This makes for a very comfortable playing position.

The bass flute is not any more difficult to play than the alto flute, but because it is relatively new and still very expensive, few orchestras have one and few composers score for it. It can be found, however, in solo and chamber music and in some film and band scores. Its most effective use is in the wonderfully rich low register where its unique warm "hollow" sound is unmatched.

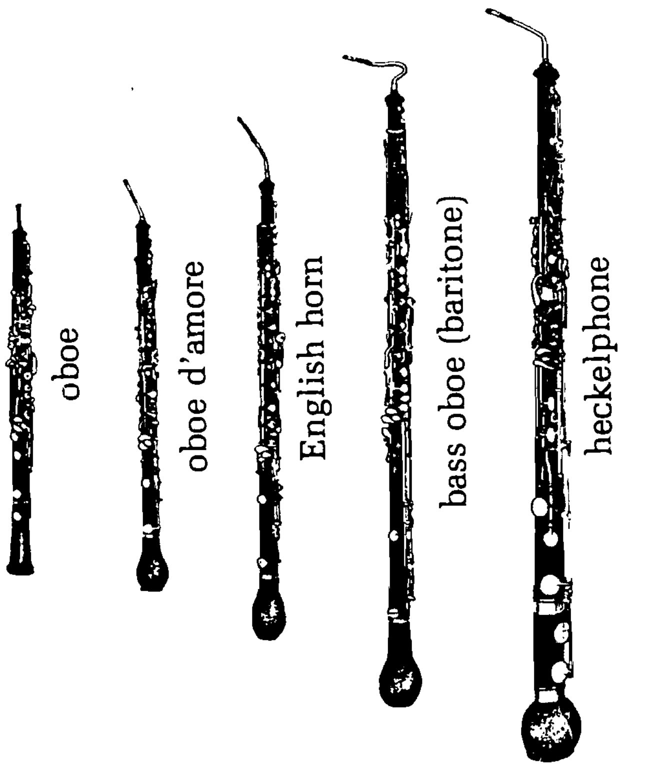
Here is an example of a bass flute passage. It must be remembered that this is a transposing instrument and sounds an octave lower than written.

Example VII–30. Zandonai, *Francesca da Rimini*, mm. 186–90



OBOE

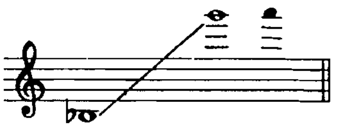
Hautbois (Fr.), *Oboe* or *Hoboe* (Ger.)





Richard Killmer, oboe

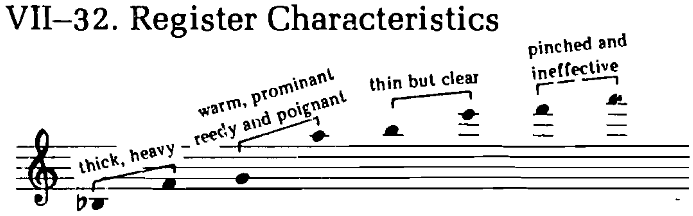
Example VII–31. Range



The oboe has possibly the most unique "voice" of all of the woodwinds. It is a double reed instrument and has a gently tapering conical pipe. Many people have described it as the *prima donna* of the woodwind choir. This is not because of its position in the section, but because of the many difficulties encountered in the performance of the instrument. The most volatile part of the oboe is the reed, which is inserted at the top of the pipe. Almost all oboe players make their own reeds, which must be exactly right if the player is to perform successfully. The reed must be thin enough to vibrate freely, but not too thin, or the tone quality will be poor. It must always be moist and is sensitive to all temperature changes as well as atmospheric conditions.

The professional oboist develops an extraordinary ability to hold notes for a long period of time or to play quite lengthy passages on one breath. However, it is imperative to realize that because of the sensitivity of the reed, the instrument is most taxing to play. The breath control required (holding the air in and letting it out very slowly until the next breathing point) makes frequent rest periods mandatory.

Example VII–32. Register Characteristics



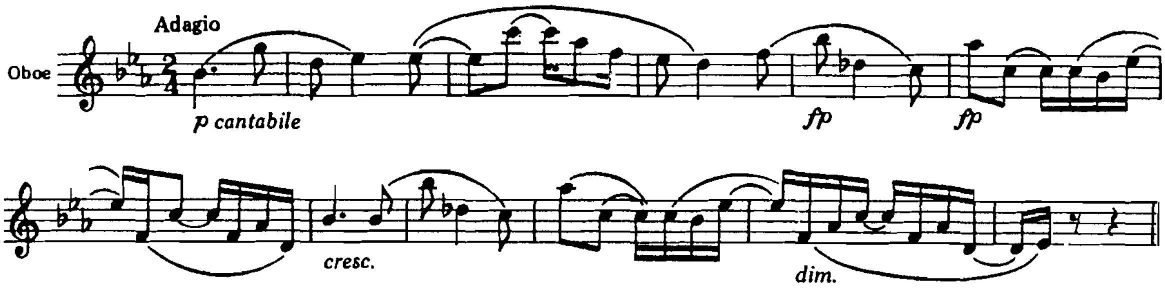
Here one can strike a contrast with the flute. While the flute gets more brilliant as it goes up in its register, the oboe loses its pungency as it goes up. Conversely, while we have described the flute as weak in its lowest octave, the oboe becomes thick and tends to "honk" in the very lowest fifth of its range. Regardless of subjective description, one should never require a *pianissimo* dynamic in this register, even from the best players. The most effective range is from the F in the first space to the C above the staff; although for a thin, softly piercing effect, the oboe is sometimes most beautifully scored in the range between high C and the F above it. These notes, however, are quite hard to control, especially for nonprofessionals.

The oboe is basically a lyrical instrument, and here are some examples of the bountiful solo use in the orchestra it has enjoyed ever since the Baroque era:

Example VII–33. Bach, *Brandenburg Concerto No. 2*, second movement, mm. 9–23



Example VII–34. Schumann, *Symphony No. 2*, third movement, mm. 8–19



Example VII–35. Bartók, *Concerto for Orchestra*, fourth movement, mm. 4–12



See also:

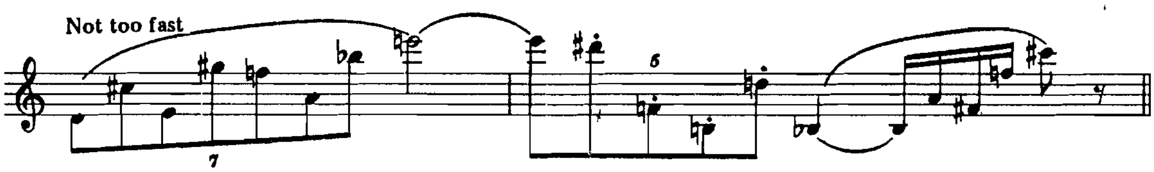
Beethoven, *Symphony No. 3*, second movement, mm. 8–12
Beethoven, *Symphony No. 6*, third movement, mm. 91–98
Schubert, *Symphony No. 8* ("Unfinished"), second movement, mm. 207–21
Schubert, *Symphony No. 9*, second movement, mm. 8–24
Rossini, Overture to *La Scala di seta*, mm. 37–53
Bizet, *Symphony in C*, second movement, mm. 8–19
Tchaikovsky, *Symphony No. 4*, second movement, mm. 1–9

Because of the oboe reed, it is possible to single-tongue very quickly in staccato passages, but double- and triple-tonguing are seldom, if ever, used. Extremely fast repeated notes are quite unidiomatic, even though some composers have called for them. Notice that in Example VI–9 Mendelssohn writes the rapid six-eight repeated figure for all the winds except oboes. This does not imply that the oboe is not a most agile instrument. On the contrary, in the hands of the great performers of today, it can be made to play almost any run, especially if the passage is not based on extraordinarily large skips.

Example VII–36. Mozart, *Sinfonia concertante,* third movement, mm. 192–200



Example VII–37*



Trills, Tremolos

It would be futile to give a list of trill and tremolo do's and don't's, for these depend very much on the model of the instrument and the proficiency of the player. On newer instruments almost all the trills and tremolos are possible except between the bottom B♭ to B♮. Half-step trills from C to C♯ are not advisable. Further, all large-interval tremolos are quite difficult above the staff, and it is unwise to write tremolos of more than a perfect fifth anywhere on the instrument.

Multiple Oboes

The standard complement of oboes in a symphony orchestra is usually two, plus an English horn. Sometimes, this complement is enlarged to three oboes or more, plus an English horn. In the early Classical orchestra, the two oboes were almost always present and most often had the task of sustaining tonic and dominant pedal notes

* Where no other attribution is given, the example was written by the author.

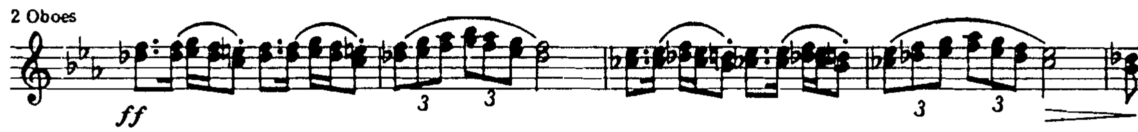
(frequently in octaves with two French horns), in addition to playing melodic passages. Later on, they were used in many different ways.

Here are some examples in which two or more oboes are used:

Example VII–38. Berlioz, *Symphonie fantastique*, fifth movement, mm. 460–67



Example VII–39. Kodály, *Háry János*, second movement, mm. 47–51



Example VII–40. Bartók, *Concerto for Orchestra*, fifth movement, mm. 249–54

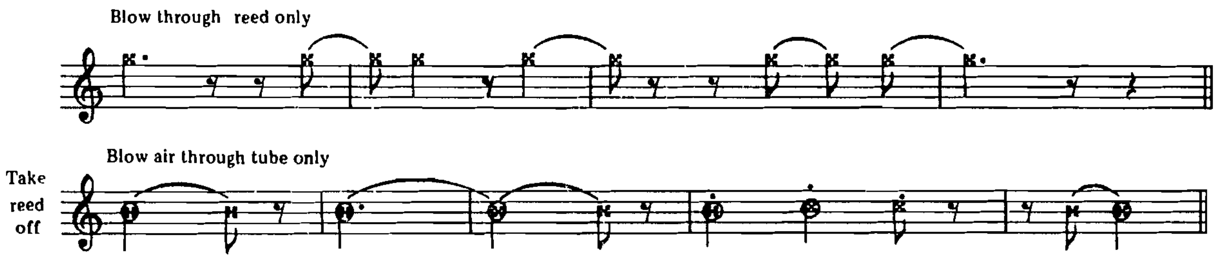


The oboe is a most poignant doubler because of its distinctive nasal quality. It can add great articulation and cutting edge to any instrument with which it is combined. Therefore, great care must be given to have it double a significant line so that an instrument that needs to be featured more prominently is not overshadowed. This problem will be discussed more fully in a later chapter.

Contemporary Extensions of Oboe Technique

In some contemporary scores, the oboe is required to execute key clicks and to blow air through the tube without producing a pitch. There are even instances when a composer asks the performer to remove the reed from the instrument and blow through it. Alternatively, if one simply wants to simulate an airflow without pitch, it is advisable to remove the reed and blow through the pipe.

Example VII–41



Bending the pitch up or down a quarter tone is also a common contemporary technique. This can be accomplished by changing the embouchure or pulling the reed out of the mouth slightly.

Example VII–42

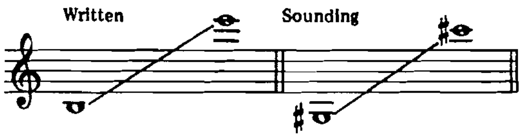


Multiphonics are quite successful on the oboe, but often sound ugly. At this writing, even though quite a few composers have demanded multiphonics, not all oboists are able to produce them. It is strongly suggested, therefore, that a composer consult with a performer as to the best available multiphonic and its fingering before writing it into a score. The fingering should always accompany the multiphonic.

OBOE D'AMORE

Hautbois d'amour (Fr.)

Example VII–43. Range



The oboe d'amore is the mezzo-soprano instrument of this family. It is a transposing instrument, which sounds a minor third lower than written. Occasionally, Bach and other Baroque composers notated the actual sounding pitches of the instrument (for instance, in Bach's *Christmas Oratorio*); it is strongly recommended that this not be done today.

This instrument was very popular in the Baroque period, but as a larger sound was needed for the larger orchestras and halls, it fell

out of favor and was supplanted by both the oboe and English horn. Nevertheless, after close to two hundred years' neglect, it is making an appearance once again.

The sound of the oboe d'amore is much gentler than that of the oboe, but since it has a bulblike bell like the English horn, its lower notes are quite full, dark, and beautiful. The upper register is quite thin and almost useless, although Strauss in his *Sinfonia domestica* calls for an F above high C. Gunther Schuller writes consistently above the staff for it, but he doubles it with other instruments in his *Concerto for Orchestra No. 2*.

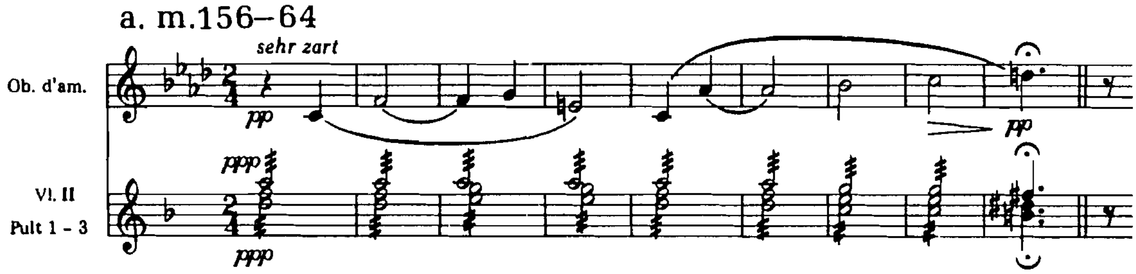
Here are some examples of the oboe d'amore as a solo instrument, as well as within an orchestral frame:

Example VII–44. Bach, *Christmas Oratorio*, Sinfonia, mm. 9–11



Example VII–45. Strauss, *Sinfonia domestica*

a. m.156–64



b. m.209–15



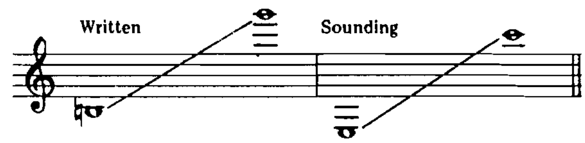
The oboe d'amore may also found in the following works:

Bach, *Cantata No. 37: Gottes Zeit,* "Der Glaube schlafft der Seele Flügel," mm. 1–6
Debussy, Gigues, [10] to [11]
Ravel, *Bolero*, mm. 77–84
Schuller, *Concerto for Orchestra No. 2,* second movement, mm. 76–77

ENGLISH HORN

Corno Inglese (It.), *Cor anglais* (Fr.), *Englisches Horn* (Ger.)
Oboe da caccia (Hunting Oboe)

Example VII–46. Range



The English horn is a transposing instrument, sounding a perfect fifth lower than written. There are no standard instruments in the oboe family that extend the range upward, but there are at least three that add notes below the oboe range. The English horn, the alto instrument of the family, is the most popular downward extension and works on the same principle as the oboe. It is a conical tube instrument, double reed, with both the tube and the reed slightly longer than those of the oboe. Added to the flared part of the oboe tube is a bulb-shaped bell (d'Amore bell), which gives the English horn a more sonorous, more melancholy sound, rather like a quail.

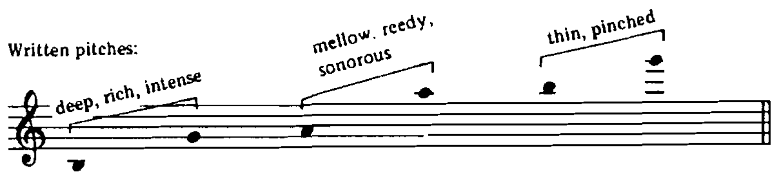
There is a great deal of conjecture concerning the name English horn. It is neither English nor does it resemble the horns in the brass family. The most plausible—though partial—explanation is that it was called "cor anglé" because of the bent shape of some of the older instruments. The French word *anglé* was then mistranslated as *anglais*, or English. Even though the modern instrument is perfectly straight, the false translation has prevailed, and it is universally known by the name English horn.

The direct antecedent of the English horn was the *oboe da caccia* (hunting oboe), which was widely used through the Baroque period. It too was a transposing instrument, sounding a perfect fifth lower than written. Bach often notated this instrument at pitch in the alto

clef, while the more antiquated French notation was in the mezzo-soprano clef. Today, if one wishes to use this practically obsolete instrument (at one's own risk), it should be notated like the English horn. It has the same range and registral characteristics as that instrument. With Medieval and Renaissance bands becoming popular these days, the *oboe da caccia*, as well as the shawm (which came in at least seven sizes in the sixteenth century), may enjoy a renaissance in our own time.

It is strange that although the English horn (or, more exactly, the *oboe da caccia*) was often used in the Baroque era, it was rather neglected from Haydn's time to Wagner's, especially in Germany. There are notable exceptions, of course, in the works of Berlioz and Meyerbeer. However, from the middle of the nineteenth century on, the English horn enjoyed a lofty position in the orchestral repertoire.

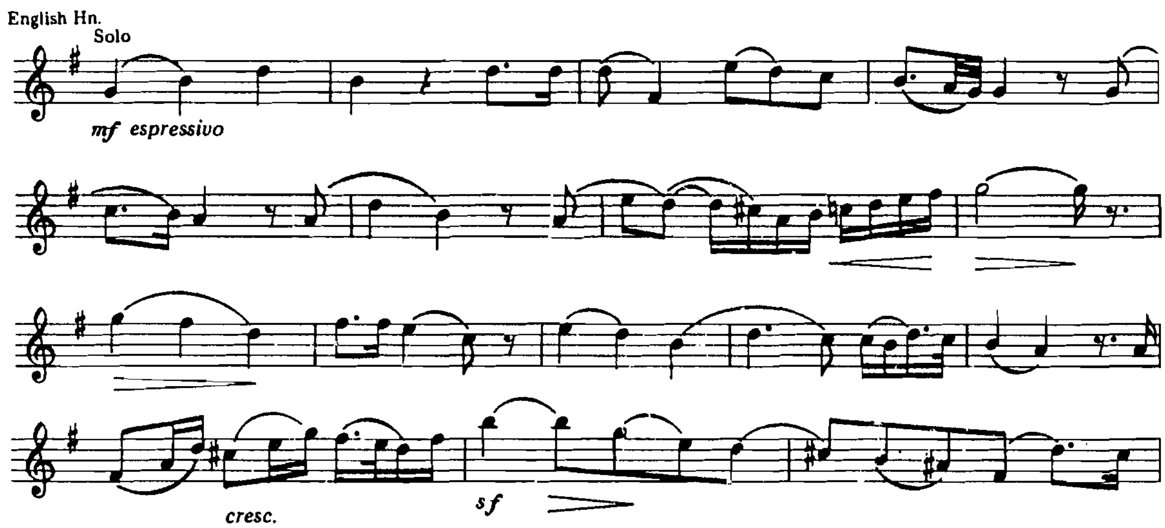
Example VII–47. Register Characteristics of the English Horn



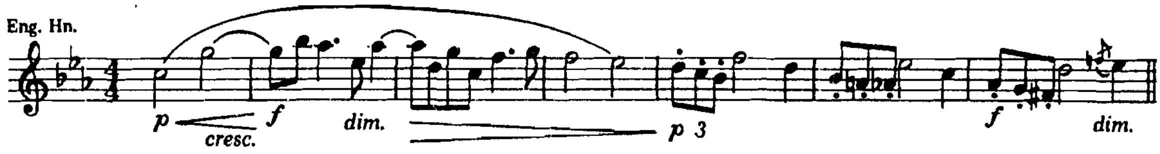
The registral properties of the English horn are like its sister instrument, the oboe: it gets thinner as it gets higher. In its upper register, the English horn sounds so much like an oboe that it loses its personality. However, its lowest fifth or sixth is richly beautiful, with tremendous expressive carrying power.

There are countless examples in the orchestral repertoire of English horn solos, both *a cappella* and accompanied. Here are some outstanding ones:

Example VII–48. Berlioz, *Roman Carnival Overture*, mm. 21–36



Example VII–49. Wagner, *Tristan und Isolde*, Act III, scene 1, mm. 5–11



Example VII–50. Sibelius, *The Swan of Tuonela*, mm. 18–32



See also:

Rossini, Overture to *William Tell*, mm. 176–80
Franck, *Symphony in D minor*, second movement, mm. 16–32
Dvořák, *Symphony No. 9* ("From the New World"), second movement, mm. 7–18
Tchaikovsky, *Romeo and Juliet*, mm. 183–89
Debussy, *Nocturnes: Nuages*, mm. 5–8
Copland, *Quiet City*, mm. 22–27
Stravinsky, *Le Sacre du printemps*, mm. 14–20

Trills and Tremolos

The same trill and tremolo problems that plague the oboe exist for the English horn, and tremolos should be carefully written and confined to small intervals, especially when they occur above the staff.

Other Considerations

The English horn is as agile as the oboe and can easily execute all active figures with the rest of the woodwinds.

As far as contemporary extensions of the technique are concerned, the great virtuoso Heinz Holliger has written and commissioned a great many works which make use of multiphonics and other microtonal sounds. These occur mostly in solo literature thus far, but they can be produced on this instrument as readily as on the oboe.

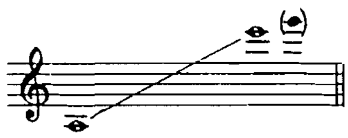
OTHER MEMBERS OF THE OBOE FAMILY

Two other members of the oboe family deserve mention. Although they are not used very frequently, the composer or orchestrator should have some superficial knowledge of their sound and notation.

The *heckelphone* is named after its inventor, Wilhelm Heckel, an instrument maker in Biebrich, Germany, who perfected this pseudo-bass oboe around 1904. It sounds an octave lower than the regular oboe and adds a semitone, the low A.

The *baritone oboe*, sometimes called the *bass oboe*, has the same range and a very similar sound as the heckelphone; the difference is in appearance. The heckelphone was made by a bassoon maker; hence, the instrument resembles a bassoon, while the baritone oboe was manufactured by an oboe maker and looks very much like a big English horn, since it also has a d' amore bell.

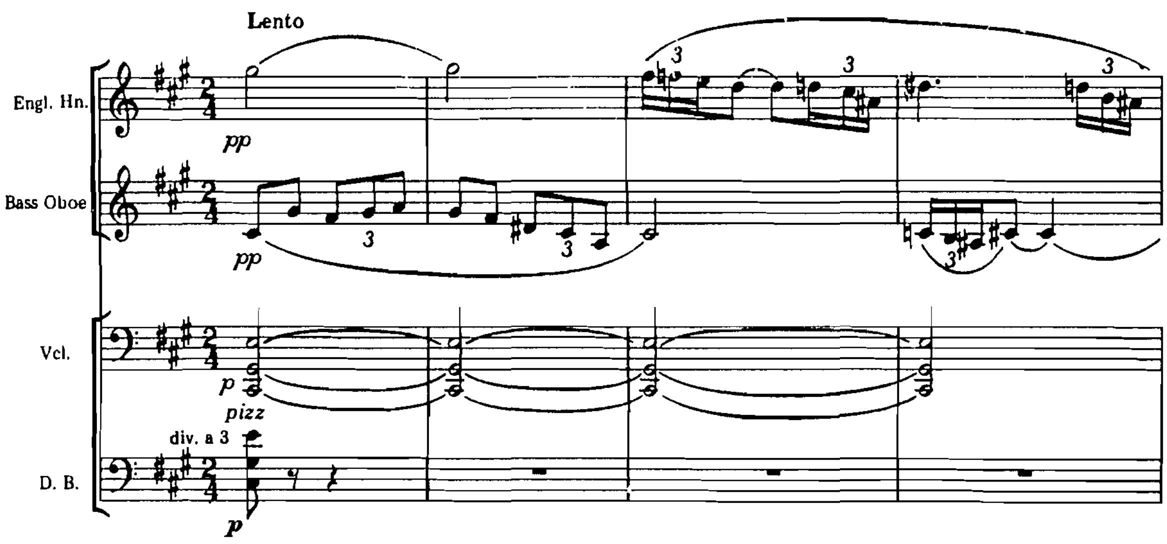
Example VII–51. Range

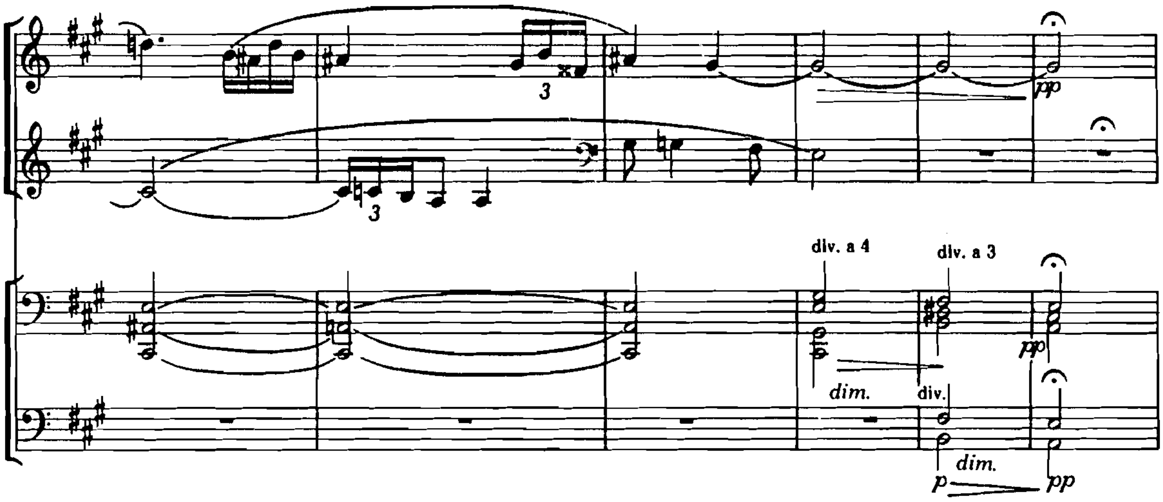


Sounding an octave lower

These provide an excellent bass for the oboe family, but as in the case of the bass flute, there are very few instruments extant, and very few orchestras would be able to supply one if it were called for in a score. Frederick Delius and Richard Strauss (in his operas *Elektra* and *Salome*) are two of the very few composers who have used the heckelphone. All parts may be performed equally well on the bass oboe.

Example VII–52. Delius, *Dance Rhapsody*, mm. 1–10





Example VII–53. Strauss, *Salome*, 326, mm. 1–5



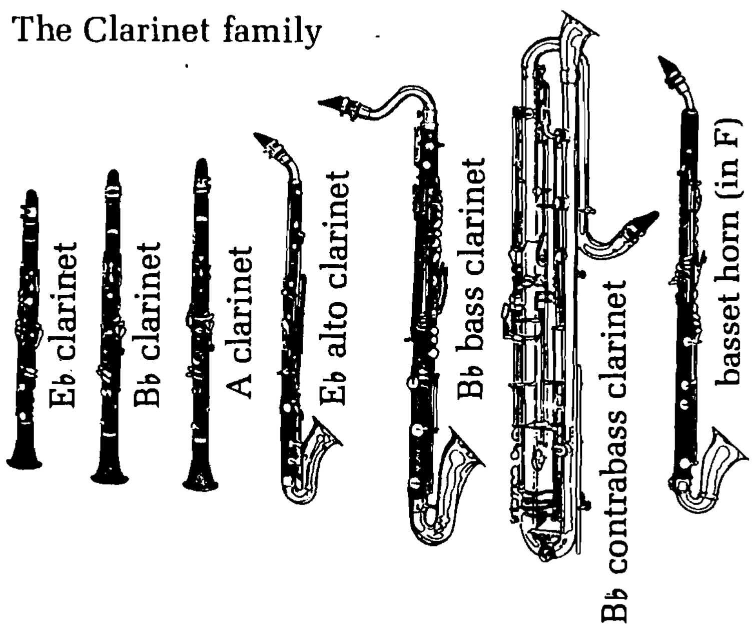
CLARINET

Clarinetto (It.), *Clarinette* (Fr.), *Klarinette* (Ger.)



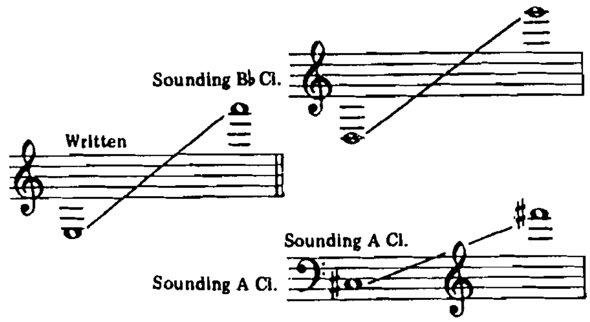
Charles Neidich, clarinet

The Clarinet family



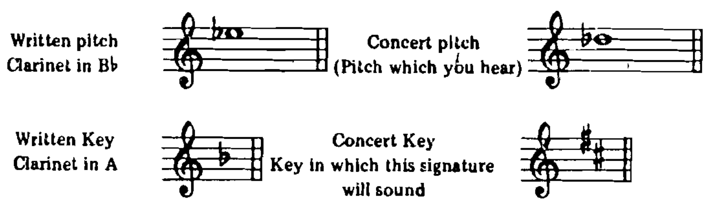
All clarinets have the same written range.

Example VII–54. Range



The lowest written note on all clarinets (with the exception of specially constructed bass clarinets) is this E: [music notation] The sound produced when that pitch is played depends, of course, on the particular instrument being used.* It is important to introduce a term which is most commonly used to distinguish between the written pitch and the sounding pitch on a transposing instrument. The note one sees on a page is usually referred to as the *written pitch*. The resulting pitch emanating from the instrument is called *concert pitch*. A similar differentiation is made for key signatures: the key in which the entire orchestra is playing is called *concert key*.

Example VII–55. Written Pitch, Concert Pitch



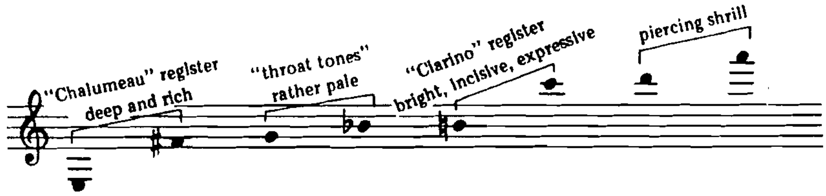
It is important to emphasize that all clarinets have the same fingering system, and all clarinetists are able to play all clarinets in the entire family. The performer will read any part as though it were written for a clarinet in C, and the instrument itself transposes according to its size. The actual clarinet in C is now rare; therefore, it is to be expected that the notes written for most clarinets will be different from the concert pitches one will hear. If a part is correctly transposed, there will be no problems with the written parts of any of the clarinets.

The instrument itself is constructed of a cylindrical tube with an added bell which flares slightly more than that of the oboe. A mouthpiece with a single reed is inserted as the uppermost joint of five sections making up the instrument. The mouthpiece is sometimes referred to as the *beak*.

* It would be wise to review the entire transposition portion of Chapter VI.

Before we discuss the quality of the different registers, it is important that one fingering phenomenon on clarinets be mentioned. "The break" on the instrument occurs between B♭ and B♮. This simply means that whereas the note B♭ is played with no keys depressed or holes covered—in other words, with the entire tube open—the B♮ requires the entire tube closed (all holes covered), with the exception of the vent hole, which is opened by the left thumb depressing the register key in back of the instrument. Since this finger transition presents problems to all but the most expert player, it is advisable that the composer or orchestrator be aware of it. The same phenomenon occurs in the other winds, but with less devastating effects, because all the other winds overblow the octave, while the clarinet overblows the twelfth. The problem of coordinating the break completely disappears as the performer becomes more experienced, so that in the end, it presents no difficulties whatsoever.

Example VII–56. Register Characteristics



The clarinet has the most homogeneous range of any of the woodwinds, no matter what part of its register it plays in. Furthermore, a good clarinettist can play the entire dynamic spectrum, from the faintest *pianissimo* to the most forceful *fortissimo*, beginning with the lowest and extending to the highest range of the instrument.

Some of the registers of the clarinet are designated with names which recall the ancestry of the family. The lowest register is called the *chalumeau* register, after the Medieval instrument, a single-reed cylindrical pipe construction antedating the modern clarinet. The third and largest register is called the *clarino* register: The word clarinet is a diminutive form of the old Italian word for trumpet which played the high parts. *Clarinetta* (little trumpet) became the name of our modern instrument because in the eighteenth century, when it first entered the symphony orchestra, the parts assigned to it could be described as "little trumpet" parts. It is strange that the designation stuck, for the instrument began to develop a very different personality in the nineteenth century. In fact, nineteenth-century composers thought of it as the nightingale of the orchestra.

Both B♭ and A clarinets are used in our modern symphony orchestras, and as has been said before, the determination of which one to use most often depends on the key of the work. For predominantly flat keys, one uses the B♭ clarinet, while the A clarinet serves best in mostly sharp keys. Nevertheless, if one were to make a statistical survey of twentieth-century scores, one would find a greater prepon-

derance of B♭ clarinets, regardless of keys, especially since the tonal element has been so obscured in modern times.

As can be seen in the following examples, the clarinet is a most agile and versatile instrument, equally effective in lyrical as well as active running passages in all registers. The staccato, while very dry and sharp, is less pointed than the oboe, but perhaps a bit more articulate than the flute. While single-tonguing is mostly used, some clarinetists are able to perform double- and triple-tonguing.

One effect that can be accomplished on the clarinet better than on any other woodwind instrument is the *niente* attack, in which the tone starts from almost complete silence without articulation.

Example VII–57. *Niente* Attack



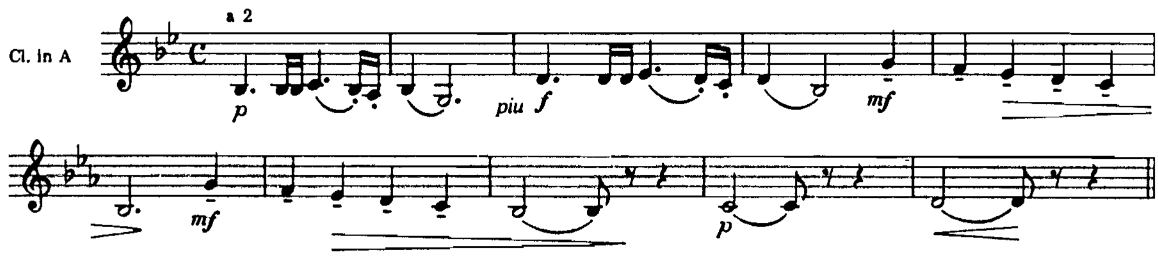
In contemporary scores, this extreme dynamic is called for in passages to be played in subtones.

Example VII–58. Subtones

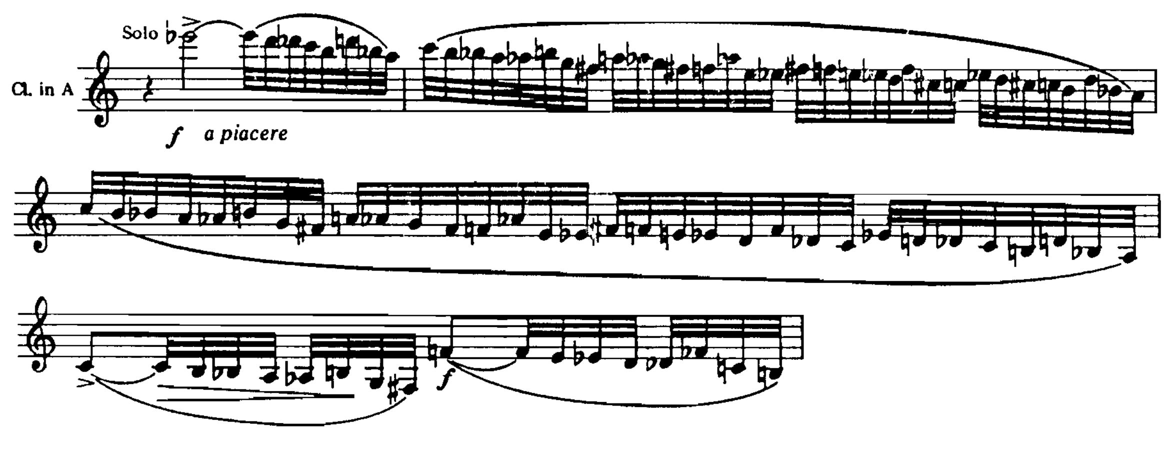


Here are some representative solo clarinet passages from the orchestral literature:

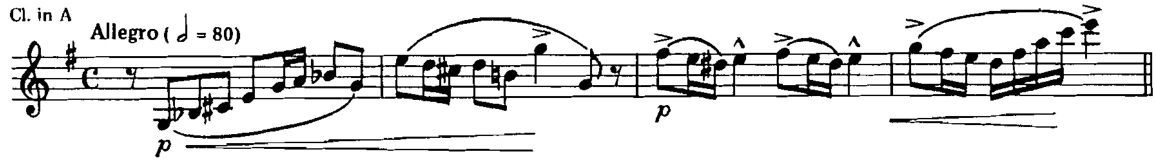
Example VII–59. Tchaikovsky, *Symphony No. 5,* first movement, mm. 1–10



Example VII–60. Rimsky-Korsakov, Le Coq d'or, [4], mm. 33–36



Example VII–61. Wagner, Overture to *Tannhäuser*, mm. 295–98



Example VII–62. Stravinsky, *L'Histoire du soldat*, "The Soldier's March," mm. 47–52



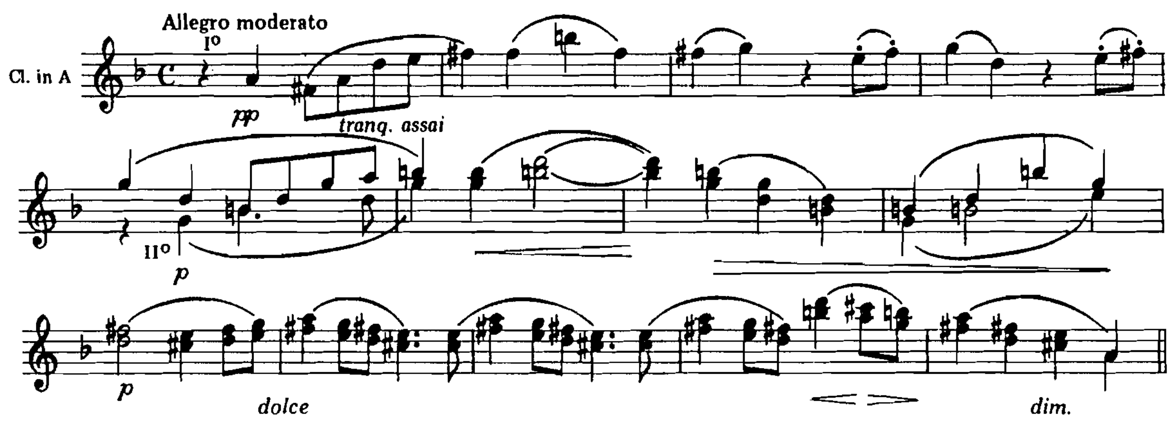
See also:

Thomas, Overture to *Mignon*, mm. 1–11
Tchaikovsky, *Symphony No. 6*, first movement, mm. 325–35
Beethoven, *Symphony No. 6*, second movement, mm. 72–77
Mendelssohn, *Symphony No. 3*, second movement, mm. 8–16
Mussorgsky, *Night on Bare Mountain*, mm. 432–40
Copland, *El Salon México*, mm. 294–308
Kodály, *Dances of Galanta*, mm. 43–57
Weber, Overture to *Oberon*, mm. 64–72
Prokofiev, *Symphony No. 5*, second movement, mm. 82–88

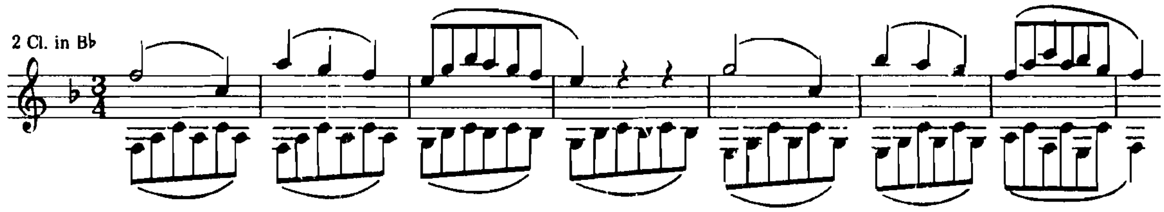
As in the case of the other three fundamental woodwinds, the clarinets come in pairs. Again, one has to mention that in the enlarged orchestra since Wagner, there can be as many as three or more, in addition to the "piccolo" clarinets and downward extension instruments, such as bass clarinets, alto clarinets, basset horns, and even contrabass clarinets.

The clarinets in multiples may play in unison, alternate parts, or, in many cases, two or more completely independent parts in different registers.

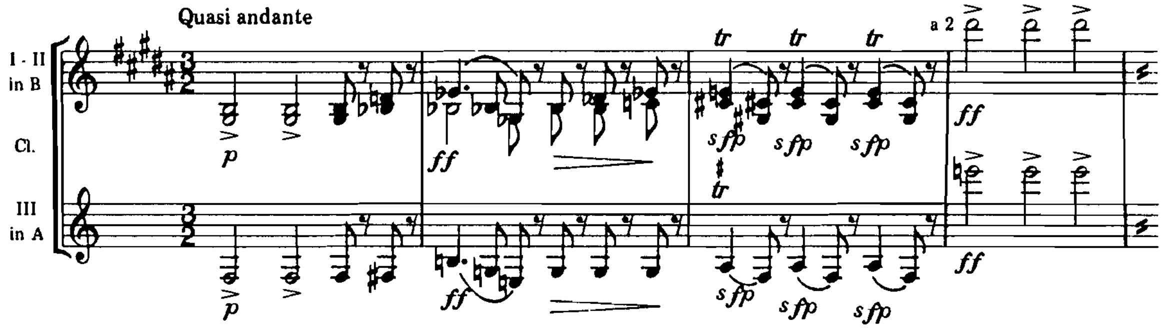
Example VII–63. Mendelssohn, *Hebrides Overture*, mm. 202–14



Example VII–64. Mozart, *Symphony No. 39*, third movement, Trio, mm. 1–8



Example VII–65. Mahler, *Symphony No. 7*, fifth movement, 252, mm. 6–9



See also:

Stravinsky, *Petrushka*, second tableau, 49, mm. 1–4
Mozart, *Cosí fan tutte*, Act I, No. 14, mm. 15–19; and Act II, scene 3, mm. 1–12
Wagner, *Siegfried*, Act III, scene 3, mm. 93–100

Trills and Tremolos

There are no trills or tremolos that cannot be negotiated on the clarinet. The larger-interval tremolos are more difficult above the staff, but are certainly possible.

Example VII–66. Kodály, *Psalmus hungaricus*, 20, mm. 2–7



N.B. Double-tonguing is almost never used by clarinetists.

Contemporary Extensions of Clarinet Technique

As has already been demonstrated, the clarinet can execute glissandi between notes. Here the "break" becomes important, for it is easier to perform glissandi above the break than below, and they can

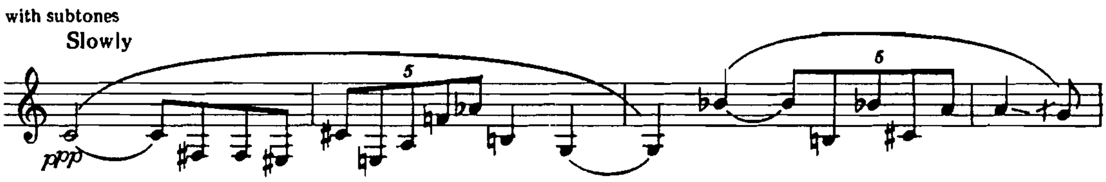
only be done upward. "Bending" the tone downward is certainly possible, but that is accomplished by the embouchure alone and should only be used if microtones are desired.

Example VII–67. Bending the Tone



The subtones or low chalumeau register, which are phenomenally quiet and ethereal, are favorites of many contemporary composers.

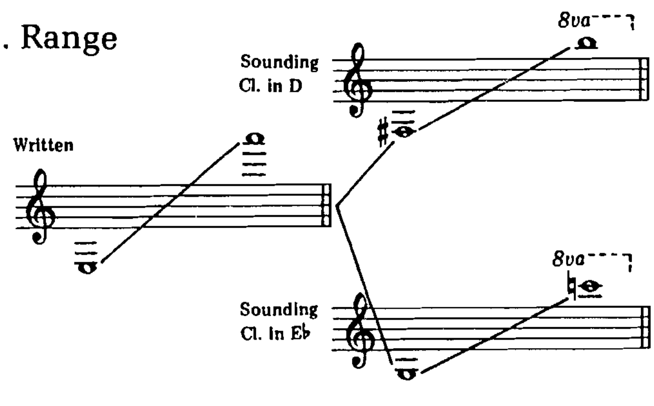
Example VII–68. Subtones



Keyclicks, blowing air through the tube, and playing pitches through the mouthpiece separated from the rest of the instrument are common contemporary devices, as are multiphonics for the clarinet. It is hoped that eventually most performers will be able to execute all of these techniques and that some standard notation will evolve. Until then, especially in orchestral scores, the composer must not expect every clarinetist to play all these new techniques successfully, and he should describe in words, besides symbols, exactly what his intentions are in a nonstandard passage.

"PICCOLO" CLARINET, CLARINET IN D OR E♭

Example VII–69. Range



The two small clarinets that extend the range upward stand in the same pitch relationship as the B♭ and A instruments and were created for similar key considerations. They both have the same

mechanical and fingering systems; however, the clarinet in D is very seldom, if ever, used today. All parts for the clarinet in D are performed on the E♭ clarinet with the player transposing the part by reading all the pitches a half step lower than written. All piccolo clarinet parts should be written for E♭ clarinet from now on.

A few special considerations must be given to these instruments, for one must keep in mind that they are smaller than the fundamental clarinets:

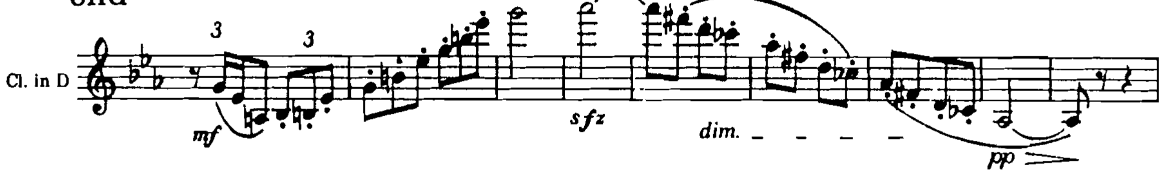
1. When a B♭ or A player has to switch to E♭, be sure he has enough time to change instruments, and allow for a moment of adjustment.
2. Even though the piccolo clarinet is constructed to emphasize its upper register, it is more difficult to play than its "sister" clarinets. Since it requires greater effort, frequent rest periods are recommended.
3. Its lower range is quite thin but certainly useful, and its upper register is quite shrill. The safest upper note is written G, although A above that is certainly possible.
4. The E♭ clarinet is used a great deal as a high solo instrument, but its personality and agility mix well with the other clarinets as a contrapuntal or harmonic partner. Further, as will be explained later, it is an excellent doubler to reinforce the flute, the violin, and even a high trumpet.
5. It has a most penetrating tone at the upper end of its register, an incisive staccato, an effective legato, and is able to perform any trills, tremolos, and contemporary devices desired of the other clarinets. The E♭ clarinet also is capable of a full range of dynamics anywhere in its range, except possibly in the last major third of its extreme high register.

Examples from the literature include:

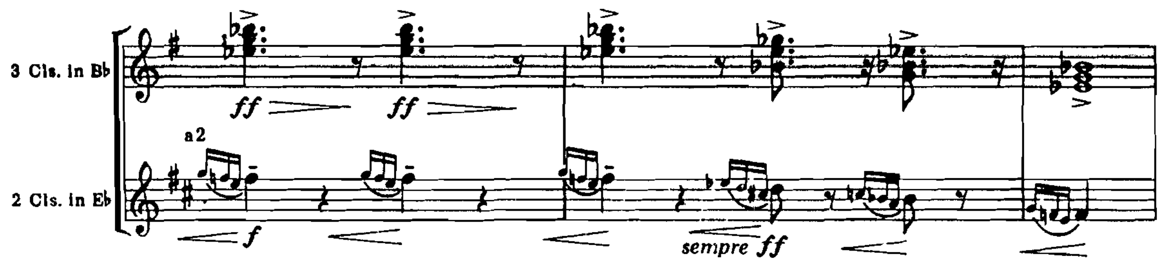
Example VII–70. Berlioz, *Symphonie fantastique*, fifth movement, mm. 40–45



Example VII–71. Strauss, *Till Eulenspiegel*, mm. 35–43 before the end



Example VII–72. Mahler, *Symphony No. 3*, first movement, [12], mm. 1–3



See also:

Strauss, *Ein Heldenleben*, mm. 124–29
Ravel, *Daphnis et Chloé*, 5 measures before [202] to [202]

BASS CLARINET

Clarinetto basso (It.), *Clarinette basse* (Fr.), *Bassklarinette* (Ger.)

Example VII–73. Range



The bass clarinet is most commonly in B♭. Although composers in the past have asked for a bass clarinet in A, this is no longer in use. In their desire to add depth and a lower range to this instrument rather than resorting to the more cumbersome contrabass clarinet, some composers have simply demanded an extension of the lower range of the orchestral bass clarinet. The low E was the accepted low note for all bass clarinets for a long time, and then an E♭ was added. In the 1930s and 1940s, Russian composers in particular called for an instrument which had a range to low C, meaning B♭ concert pitch. Nowadays, one can reasonably expect every bass clarinet to have a low E♭, but writing all the way to C is still risky, for not all symphony orchestras have instruments with such extensions.

There is a further complication in the method of notating a bass clarinet part. The problem was alluded to in the footnote on page 144. In German scores, the instrument is usually notated in the bass clef, in which case one transposes each pitch one whole step down from where it is written. The French notate the B♭ bass clarinet part

in the treble clef, to be transposed down a major ninth from where it is written. The French way is most commonly used in all scores today, and it is recommended that composers and orchestrators use it rather than the German method.

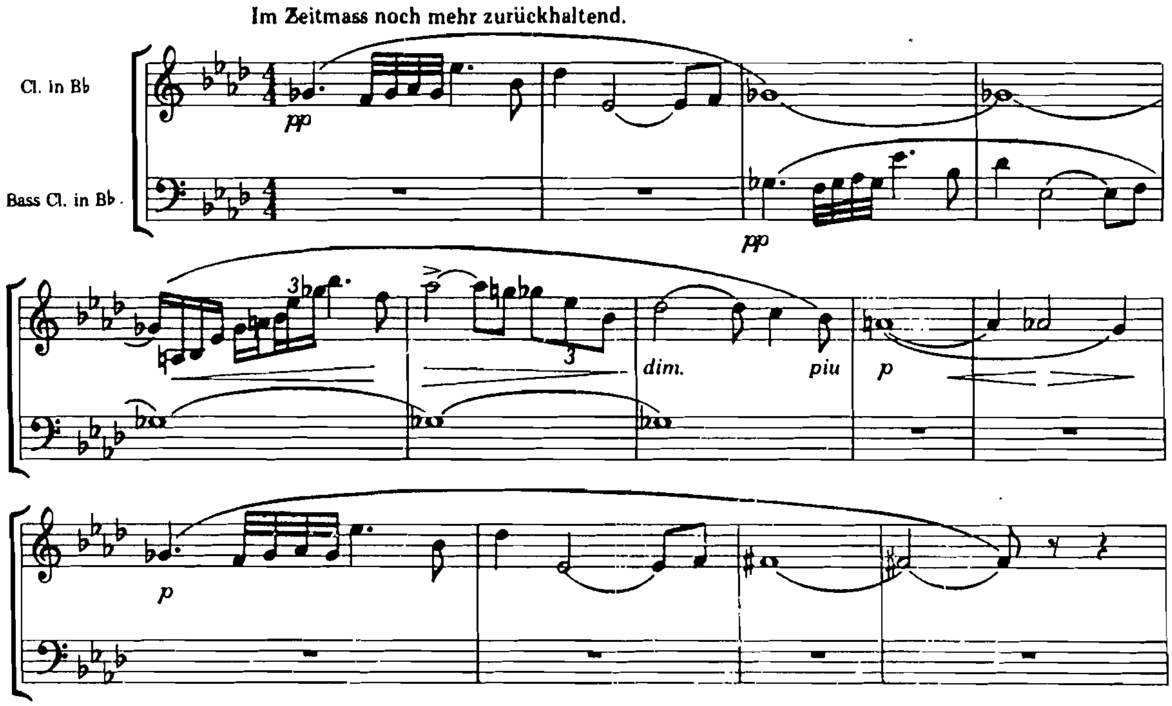
Register

The bass clarinet has the same register designations as the fundamental B♭ clarinet. Here are some special considerations one should remember when writing for the bass clarinet:

1. It is a bass instrument and the bass member of the clarinet family. Therefore, the *chalumeau* register, which in this case is the first octave and a third, has the most distinctive, the warmest, and the most effective sound, followed by the *clarino* register, which would go to the G above the staff in the treble clef. The *chalumeau* register is mysterious and shadowy and can be quite sinister, but as it goes up, it loses some of this quality.
2. The upper notes from the G above the staff to the C or even E are thin and very difficult to produce. It is true that they are often demanded, but that does not really make them any more accessible.
3. The bass clarinet can play lyrical legato as well as all kinds of staccato passages, but it speaks a bit less incisively than its smaller relatives because of its size.

Here are some examples from the literature which will demonstrate the different registers, as well as the bass clarinet in combination with other clarinets:

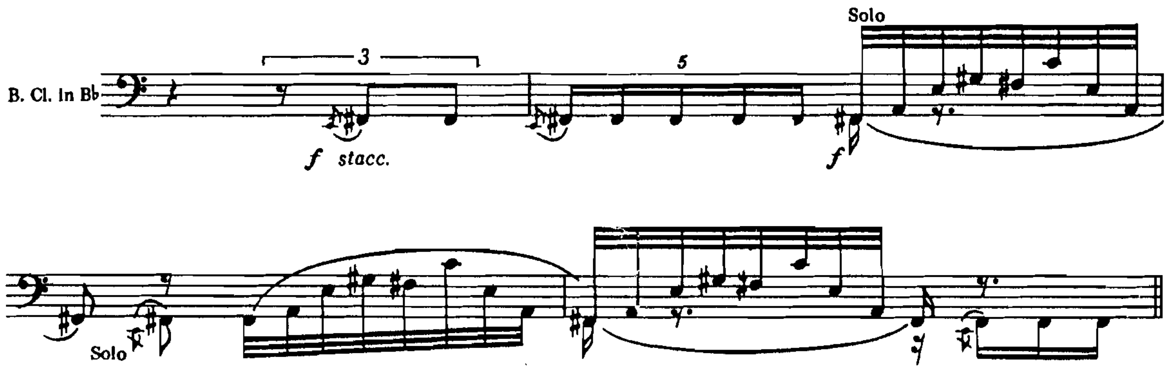
Example VII–74. Wagner, *Die Götterdämmerung,* Act I, scene 3, mm. 1–13



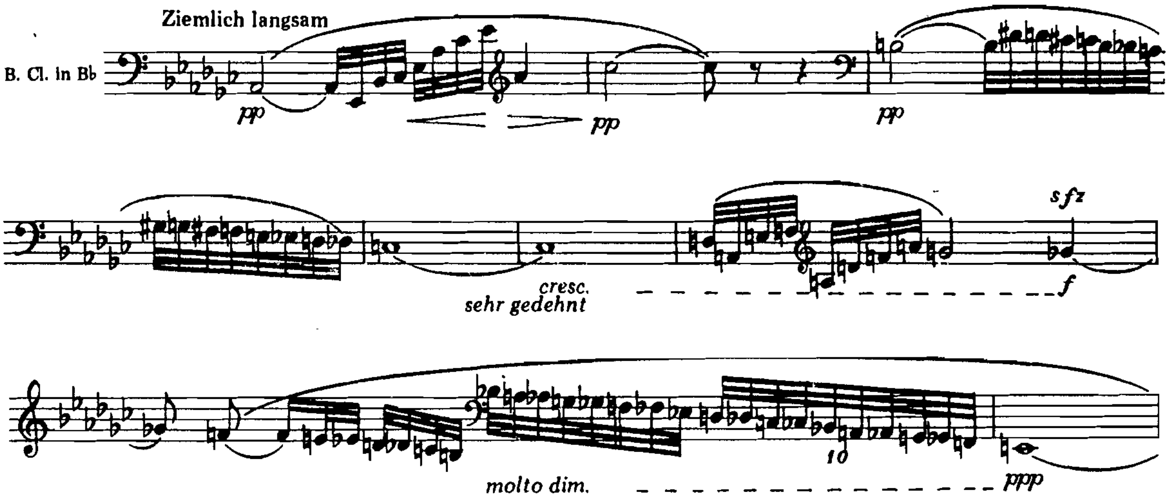
Example VII–75. Wagner, *Tristan und Isolde*, Prelude to Act II, mm. 13–20



Example VII–76. Stravinsky, *Le Sacre du printemps*, mm. 28–31



Example VII–77. Strauss, *Salome*, [320], mm. 1–8



See also:

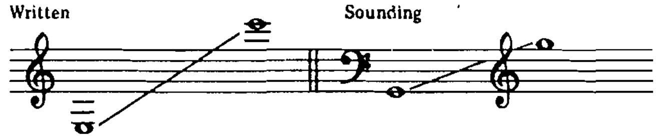
Tchaikovsky, *The Nutcracker*, "Dance of the Sugar-Plum Fairy," mm. 5–14

Strauss, *Don Quixote*, Variation I, mm. 2–4

ALTO CLARINET IN E♭

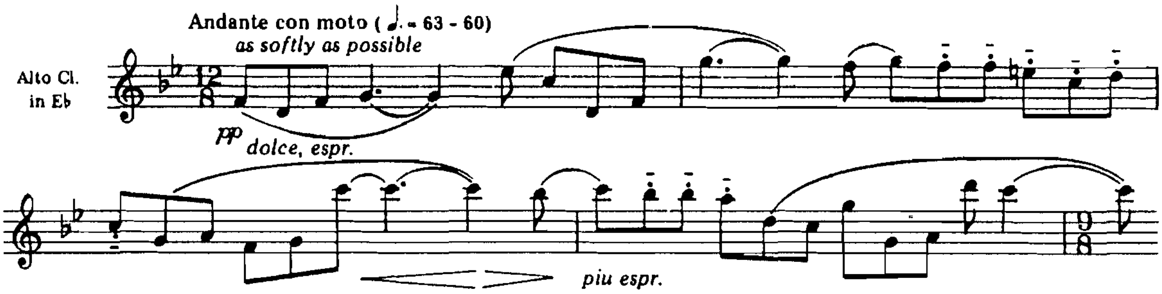
Clarinetto alto (It.), *Clarinette alto* (Fr.), *Altklarinette* (Ger.)

Example VII–78. Range



The alto clarinet in E♭ is seldom, if ever, used in the orchestra, but it has become a more or less regular member of the standard band and wind ensemble literature of this century. Though it has the same fingering and mechanical system as the fundamental B♭ or A clarinets, it does not have their assertive powers and is most effective in the first two octaves of its range. It is most useful for filling in the harmony and for rather soft solo passages. Good performers on the instrument can play *legato* as well as staccato passages, and long, lyrical melodies are as easy for them as fast, agile runs. Since so few orchestral scores have made use of this instrument, here is a passage from the band and wind ensemble literature:

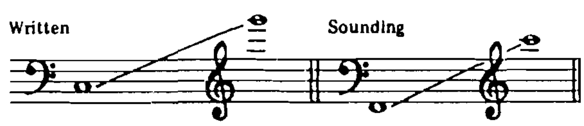
Example VII–79. Ingolf Dahl, *Sinfonietta*, second movement, mm. 1–5



BASSET HORN

Corno de bassetto (It.), *Cor de basset* (Fr.), *Bassethorn* (Ger.)

Example VII–80. Range



The basset horn is sometimes described as the real orchestral tenor clarinet. Curiously enough, like the English horn, it always transposes a perfect fifth down. Like that double-reed instrument, it is certainly not a horn but is so called probably for its sickle-shaped appearance. The confusing term *basset* may be interpretted as a diminutive form of *bass*. Invented c. 1770 by the Mayrhofers, this instrument is rarely called for in post-Strauss twentieth-century scores. However, basset horns are being manufactured once again, so that the works of the past may be performed on instruments for which they were originally written.

The bore of the basset horn is somewhat narrower than that of either the alto or bass clarinet, and it has quite a distinctive timbre described once as "unctuous seriousness." Here is an example of the use of the basset horn in the orchestral literature:

Example VII–81. Strauss, *Capriccio*, scene 2, mm. 22–26



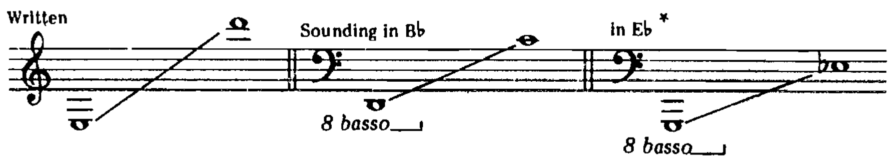
See also:

Mozart, *Die Zauberflöte*, Act II, "O Isis und Osiris"
Mozart, *Requiem*, "Dona eis requiem" (Agnus Dei), mm. 14–17
Strauss, *Der Rosenkavalier*, mm. 18–22

CONTRABASS CLARINET

This is a clarinet in B♭ (or E♭) which has a range an octave lower than the bass clarinet. It is made of metal, while most clarinets are made of wood (except for the bass clarinet or alto clarinet bells), and looks like a diminutive contrabassoon, for it is folded in upon itself.

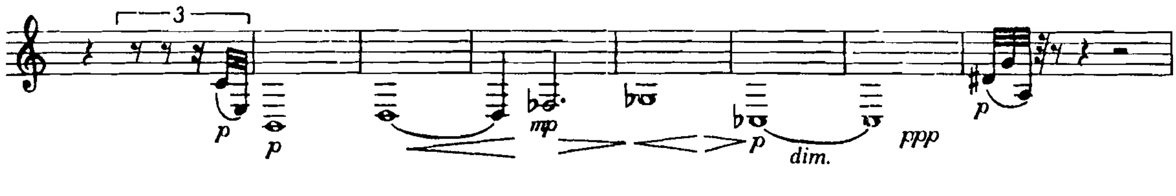
Example VII–82. Range



*The contrabass clarinet in E♭ is often referred to as the contralto clarinet, and is usually made of rosewood rather than metal.

The instrument has a very rich sound, especially in its lowest register, but does not have the agility of the bass clarinet. As yet, the contrabass clarinet, which, of course, is of rather recent vintage, does not appear in many orchestral scores, but is used frequently in works for band and wind ensemble. Here is a passage using the B♭ contrabass clarinet:

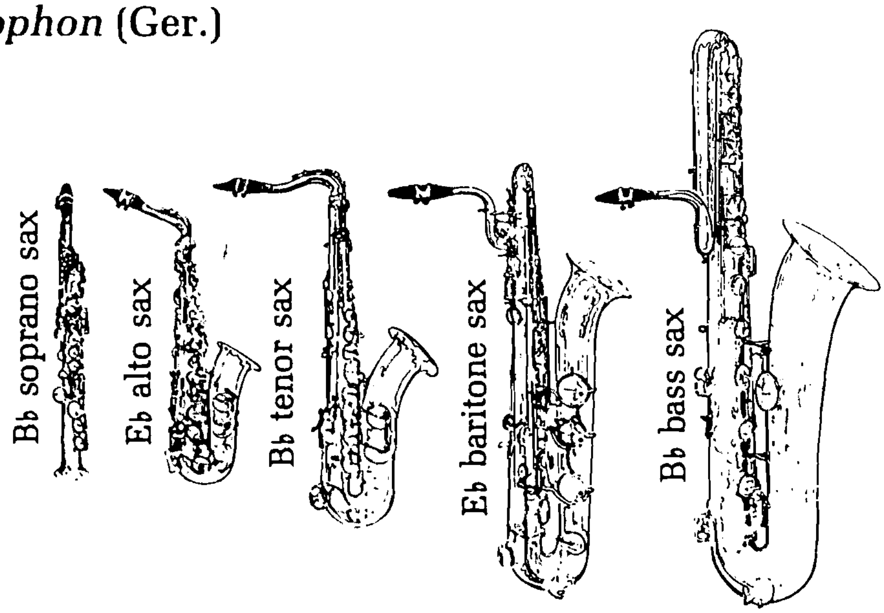
Example VII–83. Schuller, *Concerto for Orchestra No. 2*, second movement, mm. 113–20



SAXOPHONE

Sassofone (It.), *Saxophon* (Ger.)





The Saxophone family

Raymon Ricker, saxophone

Though made of brass and having a conical pipe, the saxophones need to be discussed in proximity to the clarinets for several important reasons: First and foremost, their tone is closer to the clarinet family than to any other. Secondly, they are played with a mouthpiece and a single reed very much like that of the clarinet. Thirdly, most clarinetists "double" on saxophones because they can master the fingering (which is very similar to that on the clarinet) and all

other saxophone techniques without much retraining. The instrument is used primarily as a member of the woodwind rather than the brass choir.

The saxophone was invented by Adolphe Sax in Paris around 1840. There are a great variety of saxophones in use today, and we shall discuss them as a family of instruments, since their use is somewhat limited in the standard orchestral repertoire, but very extensive and in multiple numbers in the band and jazz band literature. The entire saxophone family is most homogeneous, but for one reason or another, they have never been fully accepted into the symphony orchestra, though a great many composers of the nineteenth and twentieth centuries have used them to great advantage, especially in solo passages. The sound of all "saxes" is quite distinctive, and one may speculate that the major reason for their rejection from the symphony orchestra may be the fact that they do not blend well with the other instruments but tend to dominate whenever used. A second reason may be that the manner of playing the instrument and the sound it produced in its early days was too primitive to be acceptable. This situation has changed drastically since the 1920s, and the great virtuosos of today, with their fantastic control of every register in each instrument of the family, continue to convince composers, as we shall see in the works we examine.

Example VII–84. Range and Transpositions of All Saxophones

Written notation for all saxes

Sopranino in F (P 4 up)

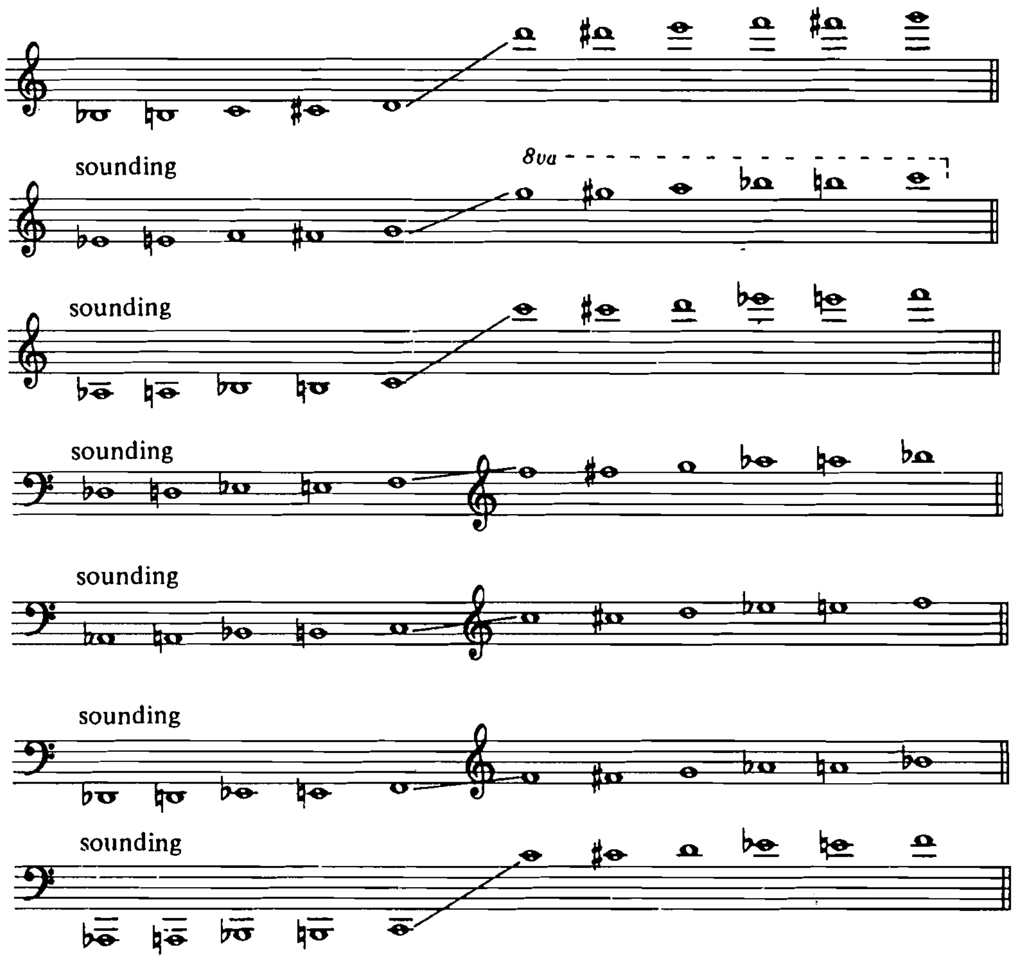
Soprano in B♭ (M2 down)

Alto in E♭ (M6 down)

Tenor in B♭ (M9 down)

Baritone in E♭ (M13 down)

Bass in B♭ (2 octaves + M2 down)



As far as the range properties are concerned, it is important to say that most players have great difficulty playing very softly at both extremes of the registral spectrum, but most especially at the very bottom of it. The register after the first perfect fifth of each instrument for almost two octaves up can be controlled beautifully. There is a difference between the jazz sound of the instrument and what is called the classical sound. The jazz sound is either quite sweet, sentimental, and full of vibrato, or very raucous, while the symphonic or classical sound tends to contain less vibrato and to be more dynamically controlled. Many of the composers of this century have used the saxophone to suggest jazz or popular music, but as great saxophone players develop their techniques, this is becoming less and less the case.

Symphonic composers have made most use of the alto saxophone (in E♭), but soprano, tenor, and baritone are also in evidence. In the symphonic band, the saxophone family is usually represented in one of the following complements:

1. two altos one tenor one baritone (one bass)	2. one soprano one or two altos one tenor one baritone one bass

The sopranino saxophone in F is very seldom used, but should be mentioned especially because Ravel gave it prominence in his *Bolero;* there is also chamber music in which this instrument appears.

Here are some examples from orchestral music since 1840. We shall encounter others in the chapter on band and wind ensembles later in this book:

Example VII–85. Ravel, *Bolero*, mm. 2–18 after [7] (Sopranino in F [usually played on the soprano] and Soprano in B♭)



Example VII–86. Bizet, *L'Arlésienne Suite No. 2*, second movement, mm. 17–20 (alto)



Example VII–87. Strauss, *Sinfonia domestica*, mm. 950–51 and mm. 964–84



See also:

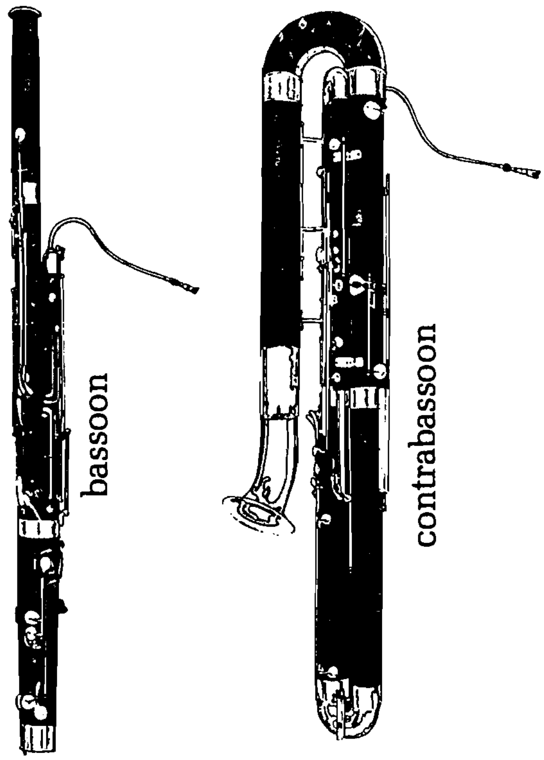
Copland, *Piano Concerto*, mm. 254–56 (soprano)
Gershwin, *An American in Paris*, [63] , *mm. 1–9 with upbeat*
Vaughan Williams, Symphony No. 6, first movement, mm. 5–10
Mussorgsky-Ravel, *Pictures at an Exhibition*, "The Old Castle," mm. 7–14
Prokofiev, *Lieutenant Kijé*, second movement, [18], mm. 1–4 (tenor)
Rachmaninoff, *Symphonic Dances*, first movement, mm. 105–20 (alto)

BASSOON

Fagotto (It.), *Basson* (Fr.), *Fagott* (Ger.)

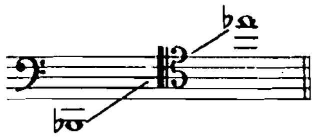


K. David Van Hoesen, bassoon



The Bassoon family

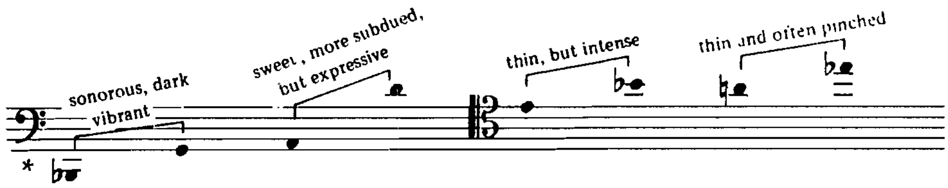
Example VII–88. Range.



The bassoon is notated in the bass clef, but when the ledger lines begin to accumulate, the tenor clef is used (from about the G above middle C upward).

The bassoon, a double-reed instrument with a conical bore, is the bass voice of the wind section. The reed is fitted onto a curved metal mouthpipe called the *crook* or *bocal*. The pitch can be adjusted by pulling this mouthpipe out slightly, thus lengthening it, or pushing it in a bit to shorten it. Although the bassoon, by virtue of its double reed as well as its conical shape, is related to the oboe, its tone is somewhat less nasal. On the other hand, it rivals the oboe in the incisive way it can produce attacks and staccato passages, and like the oboe, the bassoon performs lyric melodies beautifully.

Example VII–89. Register Characteristics



A few warnings on scoring for the bassoon: as a solo instrument, it is superb in all its registers, but when accompanied, it has a tendency to get swallowed up for it blends incredibly well with other instruments, especially in its higher registers. The low register is a very strong and noble bass for the woodwind choir, but at the same time, it has been a favorite register in which to double with cellos and basses. In this combination, the cello tone predominates, but the doubling bassoon or bassoons give added body to the sound even as they are absorbed in the whole.

The bassoon is as versatile and agile as any woodwind instrument today, and it has been a favorite solo instrument for composers in orchestral compositions since the early Baroque period. Composers have exploited its dark, foreboding lower range as well as its pinched extreme high notes. The latter, of course, recalls the famous beginning solo in *Le Sacre du printemps* by Stravinsky, which people at the first performance mistook for a saxophone. Other composers in the past one hundred years have treated the bassoon as the "clown of the orchestra" and have assigned certain staccato passages to it that truly sound humorous.

Single-tonguing is the norm for the bassoon, and this can be executed with remarkable speed. There are performers who are able to perform double- and triple-tonguing, although this is seldom called for. Slurs upward can be played with great rapidity, and large skips are quite easy to perform even between the extreme registers. However, some downward skips, because of the acoustics of the instrument, are very difficult.

Caution must be exercised in the use of dynamics for the bassoon. It is extremely difficult to play the notes of the lowest perfect fifth *pianissimo*. On these notes, one must expect a firmer attack, for it takes that to make them secure. Conversely, the extreme upper perfect fifth does not project as well as most of the lower register. If a bassoon solo is accompanied in that register, care must be taken to mark the dynamics of the accompanying instruments so that they do not overshadow the soloist.

Trills are most effective on the bassoon, but there are some to be avoided:

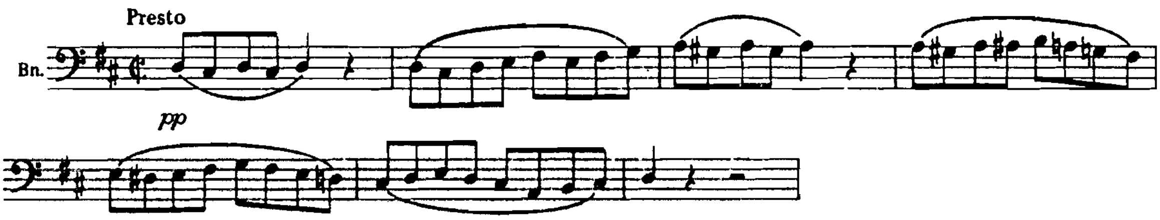
* A few works call for an A below the lowest B♭. Bassoonists produce this note by placing a small cardboard tube into the open end of the instrument.

Example VII–90.

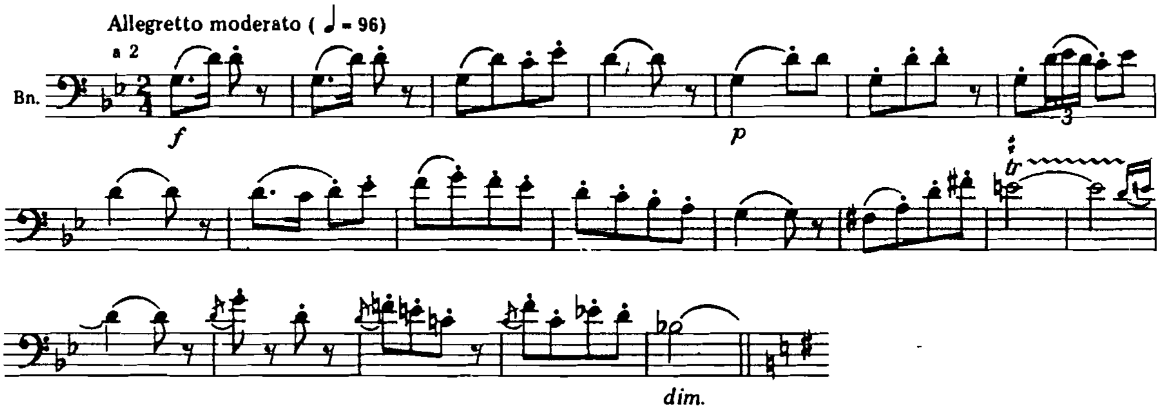


Tremolos are not very idiomatic; if needed, they should never exceed a compass of a perfect fourth. Avoid all trills from  up, except  and . Here are some examples of significant bassoon passages from the orchestral literature:

Example VII–91. Mozart, Overture to *Le Nozze di Figaro*, mm. 1–7



Example VII–92. Bizet, *Carmen*, Entr'acte before Act II, mm. 1–20

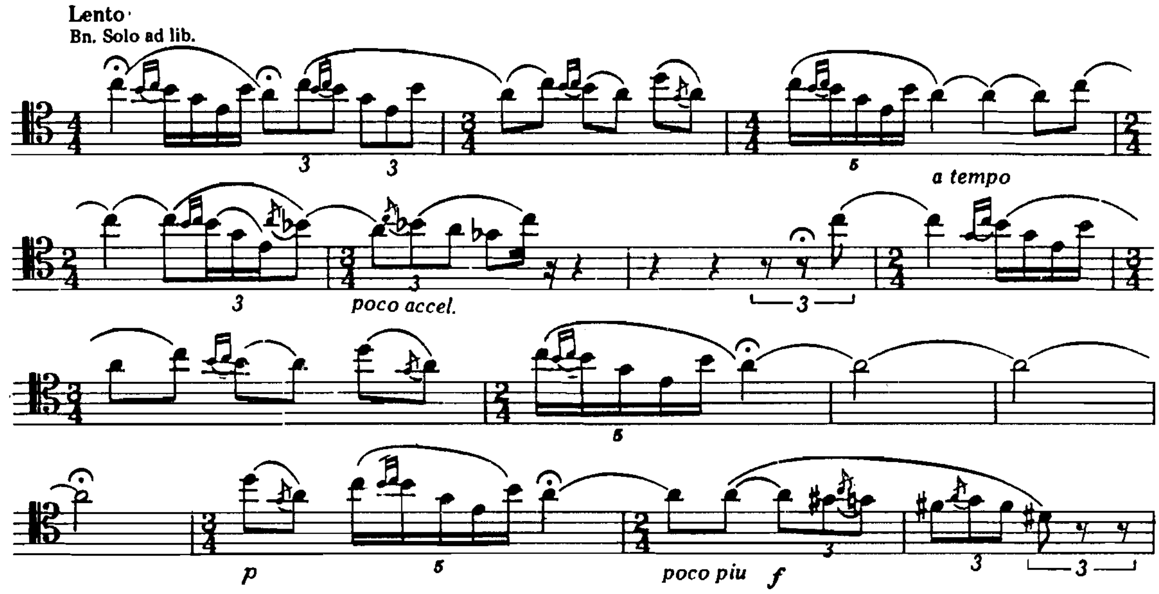


Example VII–93. Tchaikovsky, *Symphony No. 6*, first movement, mm. 1–12



* Some instruments have a special trill key for this trill.

Example VII–94. Stravinsky, *Le Sacre du printemps*, "L'Adoration de la terre," mm. 1–15



See also:

Tchaikovsky, *Symphony No. 5*, third movement, mm. 197–205
Beethoven, *Symphony No. 4*, fourth movement, mm. 184–87.
Rimsky-Korsakov, *Scheherazade*, second movement, [I], mm. 2–7
Mozart, *Symphony No. 38*, first movement, mm. 111–115
Haydn, *Symphony No. 104* ("London"), second movement, mm. 17–25
Haydn, *Symphony No. 103* ("Drumroll"), second movement, mm. 74–84
Mahler, *Symphony No. 9*, second movement, mm. 8–15
Prokofiev, *Peter and the Wolf*, [15], mm. 1–6
Ravel, *Bolero*, mm. 41–48

As it was with the flutes, oboes, and clarinets, the basic orchestral complement of bassoons is two. As the symphony orchestra expanded, bassoons in threes and even fours, with the last one usually but not necessarily doubling on the contrabassoon, were employed. The bassoons in multiples have been used in many ways, from unisons and parallel interval passages to complex contrapuntal phrases. Here are some passages for two or three bassoons without the contrabassoon:

Example VII–95. Dukas, *Le Sorcier apprenti*, mm. 72–99





Example VII–96. Bartók, *Concerto for Orchestra*, second movement, mm. 164–70



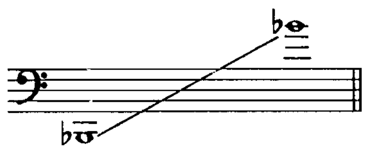
See also:

Strauss, *Don Juan*, mm. 1–3
Wagner, *Tristan und Isolde*, Act III, "Mild und leise," mm. 9–12
Tchaikovsky, *Symphony No. 6*, fourth movement, mm. 21–36
Bizet, *L'Arlésienne Suite No. 2*, fourth movement, mm. 10–16
Mozart, *Symphony No. 40*, second movement, mm. 68–71
Debussy, *Nocturnes: Fêtes*, mm. 33–35
Berlioz, *Symphonie fantastique*, fifth movement, mm. 255–77

CONTRABASSOON

Contrafagotto (It.), *Contrebasson* (Fr.), *Kontrafagott* (Ger.)

Example VII–97. Range



Sounding an octave lower than written

Both fundamental double reed instruments, the oboe and the bassoon, have no auxiliaries which extend their ranges upward, but both have downward extension instruments. The bassoon's downward-extension auxiliary instrument is the contrabassoon, which sounds an octave lower than notated and widens the bassoon's range by an octave.

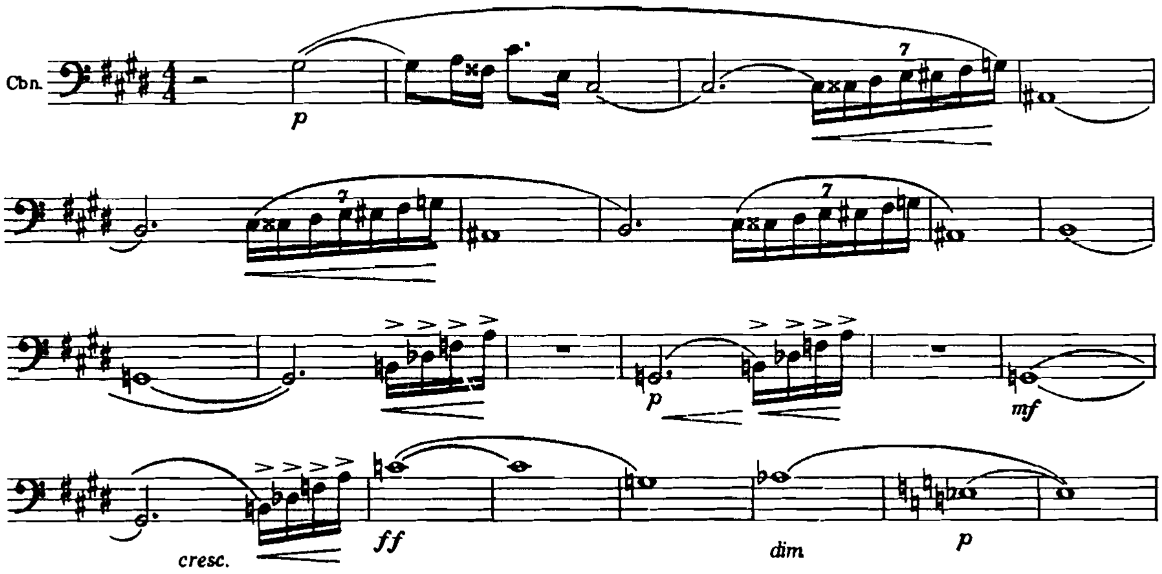
All that was said about bassoon technique applies also to the contrabassoon, only this larger instrument, especially in its lowest register, is a little bit more stubborn and resistant as far as articulation is concerned. In other words, it is a little less agile and speaks a bit more slowly at the bottom of its range than does the bassoon. This impression of clumsiness in the low register is often exploited as an asset by composers. As a matter of fact, the lowest octave is its most effective range. When sustained tones are held, the contrabassoon acts like a 32-foot organ pipe; even though the tones have a "buzz" because of the slow vibrations, it provides a solid foundation for a chord or passage, especially when it doubles cellos, basses, and bassoons at the octave. A word of caution is in order in regard to the lower range: the amount of breath it takes to produce these notes is considerable. Therefore, it is advisable to provide quite a few periodic rests so that the player can replenish his breath more easily.

Even though many composers have asked for the contrabassoon to play in its higher and even its highest register, this is not advisable, for it takes the instrument out of its most characteristic register, the lowest twelfth, and makes it just another bassoon, a little weaker and paler than its relatives.

Both legato and staccato passages are effective; but the staccato on this lowest of the woodwinds is difficult to produce quickly. Therefore, fast, repeated staccato notes are very treacherous and risky, since the air column is too large and responds too sluggishly, especially at the lower end of the register.

There are not too many contrabassoon solo passages (and even fewer concertos, although Gunther Schuller has recently written one). However, here are a few representative passages from the orchestral literature featuring the contrabassoon:

Example VII–98. Strauss, *Salome*, Act I, scene 3, [151], mm. 6–27



Example VII–99. Brahms, *Variations on a Theme by Haydn*, mm. 1–10



Example VII–100. Ravel, *Ma mère l'oye*, "La belle et la bête," mm. 114–23



Example VII–101. Ravel, *La Valse*, [37]–[38]



See also:

Beethoven, *Symphony No. 9*, fourth movement, Alla marcia, mm. 1–28.

Brahms, *Symphony No. 1*, fourth movement, mm. 47–51

Mahler, *Symphony No. 9*, second movement, mm. 35–28 before the end

Strauss, *Till Eulenspiegel*, mm. 551–58

Strauss, *Elektra*, [186], mm. 1–18

Bloch, *Schelomo*, last five measures

8

Scoring for Woodwinds and Woodwind-String Combinations

"To orchestrate is to create, and this cannot be taught." This statement by Rimsky-Korsakov would seem to come a bit late in this text. Why here? And why quote such a negative statement in an orchestration book? The answers to these questions will, it is hoped, dispel a great deal of misunderstanding concerning the handling of the woodwind section. It will also shed light on the manipulation of the brasses and percussion as a part of the symphony orchestra, which are dealt with later in the book.

While the string choir is more or less homogenous in sound, and plays more or less continuously throughout most orchestral compositions, the woodwind choir, which is not at all homogenous, is reserved for specific functions. The most common of these have been:

1. a harmonic background to a string foreground;
2. solo passages—either entire melodies, melodic fragments, or smaller melodic gestures;
3. as contrasting color repeating or echoing a passage previously played by the strings; or dividing a passage between strings and winds;
4. to double other instruments of the orchestra.

Though a great deal of wind chamber music has been written, there are very few compositions for winds which rival the string orchestra literature of the past 300 years. Exceptions, such as the *Divertimenti* and *Serenades* of Mozart, the *Serenades* of Dvořák and R. Strauss, and the *Symphonies* of Gounod and Milhaud, are appearing more and more frequently on symphonic programs. It is noteworthy to observe that in most of the aforementioned works two or more horns are included as part of the woodwind section. We shall continue to notice the inclusion of horns as we study the use of winds in the symphony orchestra, because from the Classical orchestra onward, horns were considered part woodwind, part brass, and their function was also divided. Often they are assigned pedal dominant or tonic notes similar to those given to the oboes in the early Classical symphonies. Other times they double the winds to strengthen them. Traditionally, the horn is a member of the woodwind quintet as well as the brass quintet.

WINDS IN THE SYMPHONY ORCHESTRA

As we examine the use of the winds in the symphony orchestra, preference, taste, choice, and even prejudice enter more and more into our considerations. It was certainly simpler to figure out why Brahms used the cello to introduce the slow movement theme in his *Third Symphony* than it is to determine by logical means why a certain woodwind instrument or combination states a given theme, except possibly for reasons of range.

1. Why did Schubert use a combination of unison oboe and clarinet for the first theme in the *Unfinished Symphony*?
2. Why did Debussy have a combination of unison flute and oboe play the long theme in the final movement of *La Mer*?
3. Why did Berlioz choose the English horn to introduce the *idée fixe* in the *Symphonie fantastique*?
4. Why did Stravinsky open *Le Sacre du printemps* with the bassoon?

Since we are dealing with the heterogeneous members of an instrumental choir, questions of taste and color preference become all-important. We have already discussed the sound and registral characteristics of each woodwind instrument; now we must learn how to use them in combination. Experimentation with the next few examples from the great symphonic literature will greatly aid the student orchestrator, who should be thoroughly familiar with the exact sound of the different combinations. We will begin with Schubert's *Symphony No. 8 in B minor* ("Unfinished").

1. The first major theme after the opening is introduced by the first oboe and first clarinet in unison. Both instruments are in a good register, and both can play *pianissimo*. In every orchestration book, the student is told not to use this doubling in a melody for three reasons:
   a. The oboe with its nasal quality will overshadow the clarinet.
   b. The conductor will have to balance the two by having the oboe play softer.
   c. Clarinet and oboe will have great difficulty staying in tune with each other.

Example VIII–1. Schubert, *Symphony No. 8*, first movement, mm. 12–35







How fortunate that Schubert did not read any of these books and took a chance on this passage, which has a mysterious color because of the doubling. Every live performance will be slightly different; the instruments, the players, and the acoustics of the hall are variables which will influence the results.

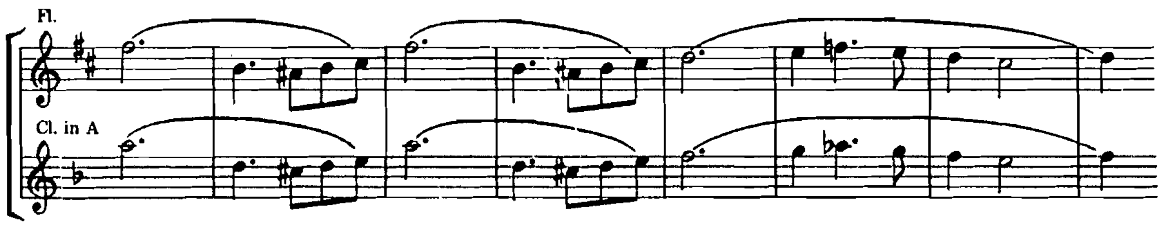
2. Let us combine flute and oboe in the same passage. The oboe, being in a more advantageous register, will certainly stand out, but the flute will somewhat neutralize the nasal quality of the oboe and give the passage a rounder, richer sound.

Example VIII–2



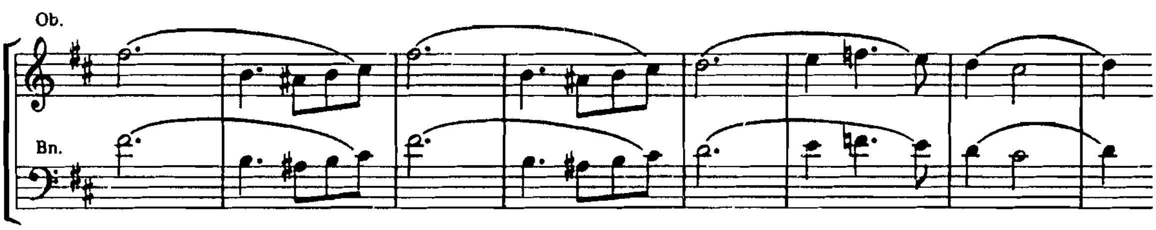
3. The combination of flute and clarinet would eliminate the bite of the oboe sound. In this pairing, the clarinet would be the most poignant factor, while the flute would contribute little more than a thickening of the resulting tone.

Example VIII–3



4. The bassoon does not have the range to play this tone in unison with any other wind instrument, but could be coupled at the octave. All of these combinations would be most sonorous. Here is a version for oboe and bassoon in octaves, and another in Mozart's favorite color combination, flute, clarinet, and bassoon in a three-octave spread.

Example VIII–4



Example VIII–5



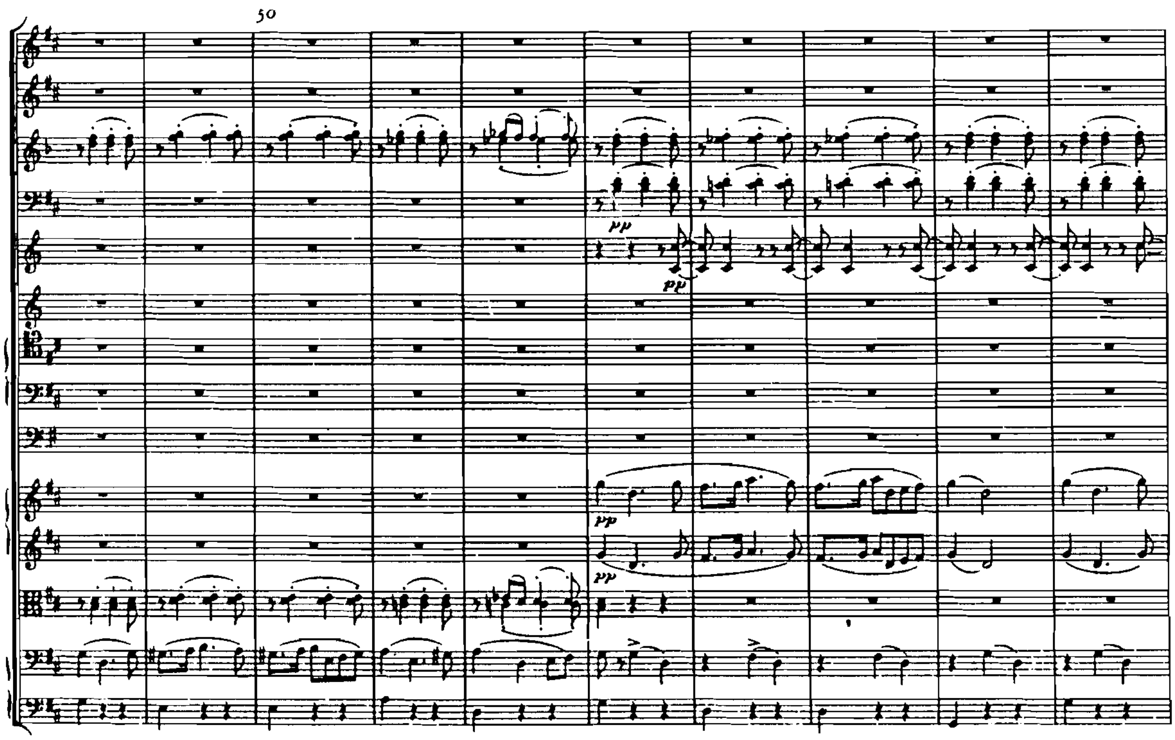
Examples VIII–4 and 5 are both unacceptable, because they anticipate the expansion of the registers to which Schubert is heading (see the "comment interlude" of the bassoons and horns, mm. 20–21, and the climactic cadence, mm. 28–29). Notice that in the score the flute enters almost undetected in m. 26, doubling the oboe for the crescendo, but is not really heard until it plays the highest notes of the cadential chords in mm. 28–29. All these considerations probably have something to do with Schubert's original choice of the oboe-clarinet combination.

Before leaving this work, it is important to note that the woodwind role in the introduction to the second main theme is reversed: first the clarinets combine with the violas, then with the bassoons to assume the duties of accompanists. By orchestrating each major thematic element differently, Schubert enhances the clarity of the form and the ease with which each idea is communicated.

We will be looking at other excerpts that illustrate the melodic function of the woodwinds. However, the winds (and horns) served another important purpose, especially in forte tutti passages of the Classical and Romantic repertoire: they were used to strengthen the

Example VIII–6. Schubert, *Symphony No. 8*, first movement, mm. 36–79




50
pp
pp
pp
pp


60
decresc.
decresc.
decresc.
decresc.
decresc.
decresc.
a 2.
ff
fz
cresc.
arco



harmony, providing pedals which gave a strong, continuous, and solid quality to the music. Here is the opening statement of the theme from Mozart's *Symphony No. 29*, K. 201, which is scored for the typical early Classical orchestra:

Example VIII–7. Mozart, *Symphony No. 29*, first movement, mm. 1– 5



In Example VIII–8, we have the first tutti of the first movement, with the traditional use of the pedal A in both the oboes and horns. Just for the sake of comparison, let us consider this passage without the tonic pedal. (See Example VIII–9.) Notice the lack of stability and grandeur without those sustained tones in the first six measures. Notice, too, how much the pedal added to the power of the cadence (especially the skip of an octave by the second horn which so dramatically emphasizes the dissonance.)

Example VIII–8. Mozart, *Symphony No. 29*, first movement, mm. 13–23

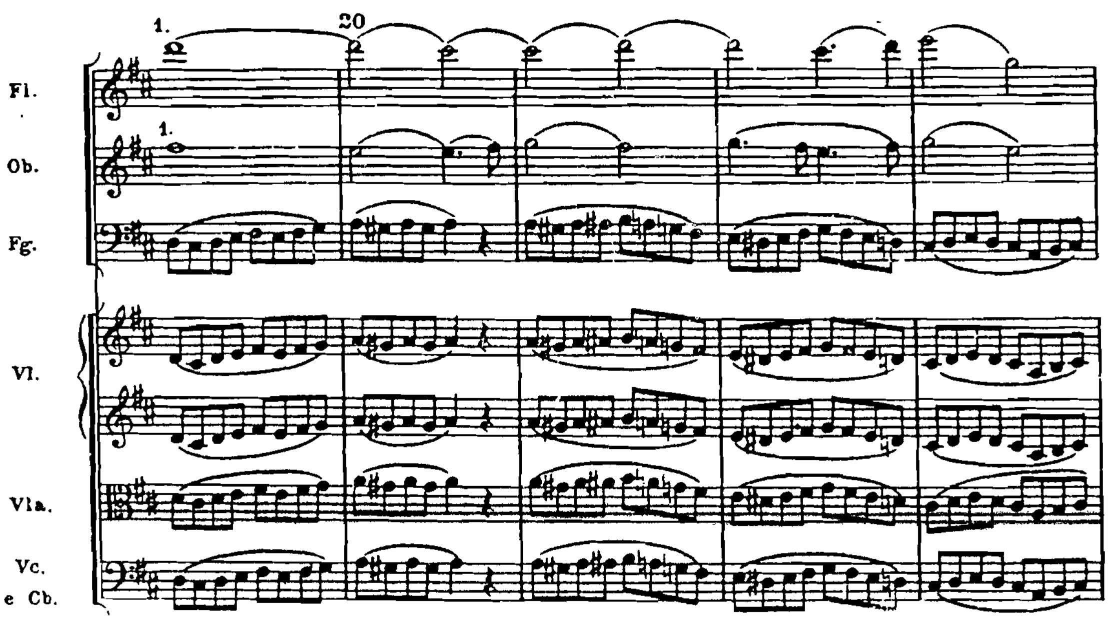


Example VIII–9



We encounter a more sophisticated kind of sustained woodwind writing over an active string theme in the overture to Mozart's *Marriage of Figaro*. The flute and oboe play a sustained harmonic background, while the bassoon doubles the cello part. The bassoon doubling is certainly audible even when performed softly, since it is the only nonstring playing the part. It adds a wonderful new color, but in Mozart's time was probably used for more pragmatic reasons. Since the cello and bass sections in the theater orchestras of that day

Example VIII–10. Mozart, Overture to *Le Nozze di Figaro*, mm. 19– 42




30
Fl.
Ob.
Cl. (A)
Fg.
Cor. (D)
Tbe. (D)
Timp.
Vl.
Vla.
Vc. e Cb.
Vc.
Bassi
p
ff
a 2
fp
f
p



were very small, the bassoons were frequently used to bolster the bass. Today the beautiful coloristic effect remains. Notice the wide distance between the strings and the flute and oboe. This adds great prominence to the sustained counterpoint without detracting from the major thematic idea.

It is very beneficial to study this overture for the different ways in which the sustained pedal or other sustained harmonic gestures are employed. Two more will be pointed out in this discussion, after which the student is urged to analyze the score to find other instances where this device is used, since it is the trademark of much orchestral music of the late eighteenth and early to late nineteenth centuries.

1. Chords built by flutes, oboes, and clarinets sustain and clarify the harmony, aid in the *fp* effect of mm. 35, 37, and 39, and lend weight to the tutti effect of the cadence at m. 45. (See Example VIII–11.)

2. Immediately thereafter, the winds, brass, violas, cellos, and double basses play a melodic or thematic fragment, while the violins perform what we may call an agitated pedal or an ornamented pedal on A. This kind of pedal was more popular in strings than in woodwinds, especially during Mozart's time.

Example VIII–11. Mozart, Overture to *Le Nozze di Figaro*, mm. 43–58





In a subsequent chapter the idea of pedal orchestration will come up again, for the brass section was often called into play also; therefore, one more example here should suffice for the moment. Example VIII–12 on p. 240, from the overture to *Die Fledermaus* by Johann Strauss, Jr., should illustrate that the pedal harmonic effect does not lessen the light character of this passage, but simply ties it together harmonically, while pointing up the spiccato nature of the tune and accompaniment by contrast. Strauss uses a valuable trick after the first statement of the melody in m. 83. He suspends the pedal for a moment so that the anacrusis to the second statement in the first violins is clearly heard; thus, this repetition is separated from the initial exposition. This device also provides a natural breathing space. Its omission later on contributes to the tension after m. 99.

When called upon to orchestrate or transcribe a work by masters who worked in this style between 1750 and 1880, one should employ this pedal or sustained harmony effect to great advantage whenever possible.

Example VIII–12. J. Strauss, Overture to *Die Fledermaus*, mm. 76–101 (upbeat to m. 76 omitted)




90
Fl.
Ob.
Cl. (A)
1.
Fg.
Vl.
Vla.
Vc.e Cb.

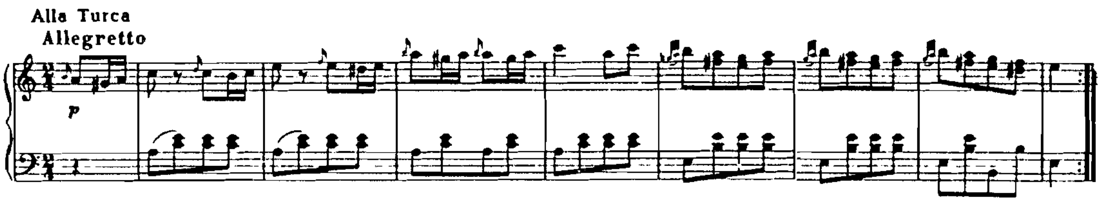

Cl. (A)
zu 2
poco rit.
100
Fg.
poco rit.
Cor. I II (F)
poco rit.
p
Vl.
poco rit.
poco rit.
Vla.
poco rit.
Vc.e Cb.
poco rit.
poco rit.

TRANSCRIBING FROM PIANO TO WINDS AND STRINGS

Here are two rather simple and straightforward examples of transcriptions in which the material seems to call for pedal effects. The first is the beginning of the final movement of Mozart's *Piano Sonata in A major*. It is marked *alla Turca*, and therefore the use of double-reed instruments suggests itself as a suitable color for the sustained tonic and dominant pitches.

Example VIII–13. Mozart, *Piano Sonata* K. 331, third movement, mm. 1–8

a. Piano Version



b. Orchestral Version



The second example is a short piano piece by Robert Schumann (first eight measures). The setting is for winds in pairs, and the harmony, which is only outlined in the piano version, has been slightly enriched and octaves added to give a more orchestral sound. Schumann's own orchestration is usually quite heavy in octave doublings; therefore, these octaves are consistent with his style. The sustained quality of the sostenuto pedal is easily provided first by the clarinet and then the bassoon. Before one sets out to transcribe or orchestrate anything by any master of the past, it is important to study his orchestration technique carefully and learn all about his idiosyncrasies and preferences in order to retain that composer's

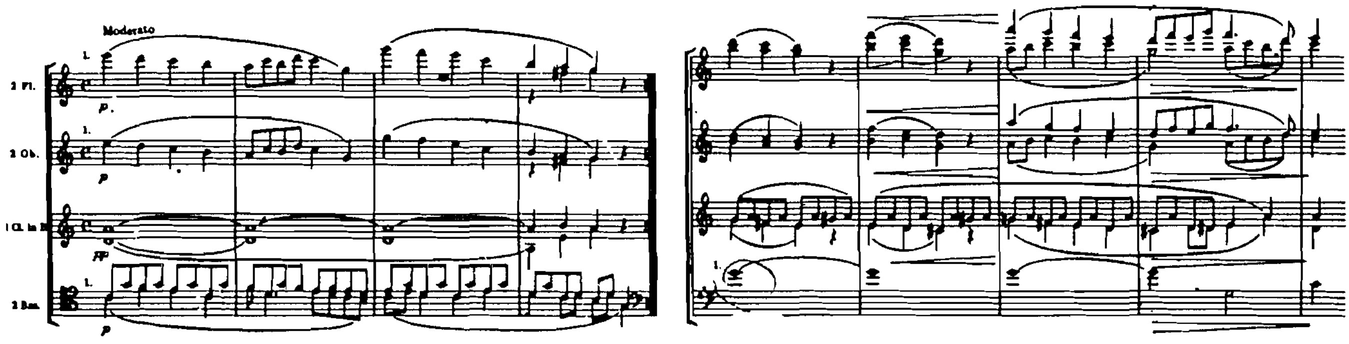
style. This is especially true on the use of wind instruments. Which were his favorites? And for what kinds of gestures did he use winds? What kinds of doublings are found in his most characteristic orchestral works? The answers to these questions can give great insight into the individual sound of a particular composer.

Example VIII–14. Schumann, *Melody*, mm. 1–8

a. Piano Version



b. Orchestral Version



MELODIC TREATMENT

We have already discussed the assignment of a melody to a woodwind instrument when we introduced each instrument separately in the previous chapter. Let us suppose we have chosen an instrument for a certain passage, and it is perfect in all ways, but we question whether it will be strong enough to carry the tune alone. When do you double an instrument with a like instrument? In other words, do two flutes sound louder than one? Is the sound of two clarinets playing the same gesture more intense than one playing alone?

These are very controversial issues, and experts disagree. The question is best rephrased by asking what is the difference between the sound of one oboe or bassoon on a part, and two oboes or bassoons on a part. The answer may recall the discussion concerning muted strings and brass. The mute may soften the instrument, but it also changes its basic color. This is also true of doubled solo passages by the same two instruments. Since they can never be absolutely in tune with one another, the overtone balance is upset, the sound thickened, and in certain registers, muddied. The essential timbre of the solo instrument is altered. Further, a unison solo of two

like winds limits and impedes the expressive quality and prohibits any slight rubato which a single player would add to the interpretation. We are speaking now of ordinary solo passages, not tutti sections where simple volume is required and the characteristic timbre not crucial.

To illustrate the sound difference, let us take the following tune by Rossini from his *Semiramide* overture, consider it on each of the four basic instruments, and then "a 2."

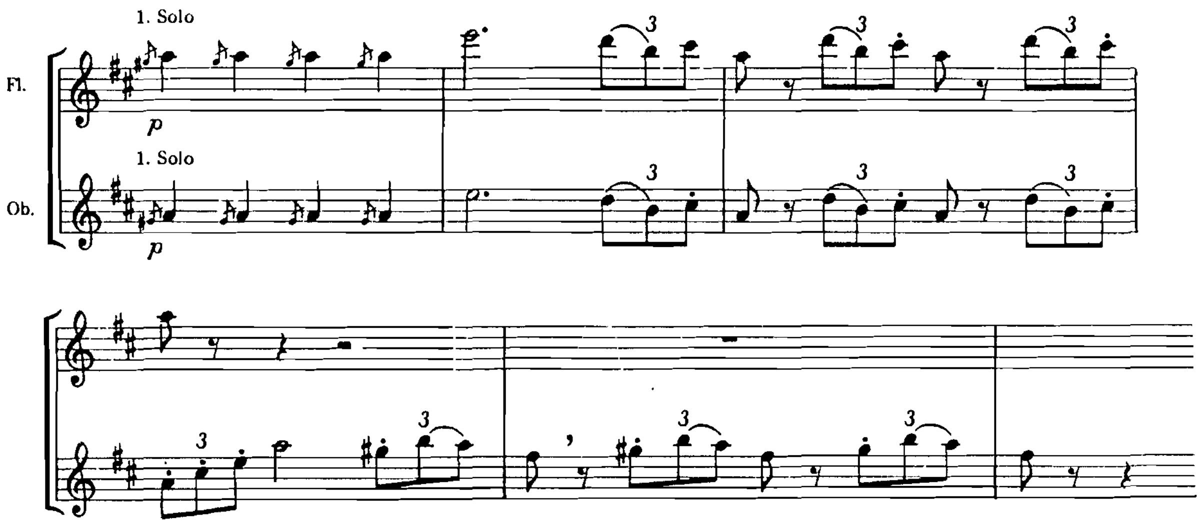
Example VIII–15



Doubling wind passages in octaves has already been established as an accepted norm, and a student may want to turn to pipe organ registration for hints of fine orchestration in this regard. When an organist wishes to add color and volume to a tone, he usually couples the fundamental (eight-foot stop) with an octave (four-foot) and a double octave (two-foot). This gives a transparent but forceful sound, while simply adding more fundamentals (eight-foot stops) would take away a great deal of the clarity. Octave doubling is a good idea for winds a 2.

Example VIII–16





Since we have just abused Rossini for our didatic purposes, let us give him his due and show how he actually handled the passage using the eight-foot–four-foot principle beautifully.

Example VIII–17. Rossini, Overture to *Semiramide*, mm. 177–92



VARIETY OF ORCHESTRAL TREATMENTS

Keeping these discussions in mind, let us now briefly analyze some passages from the orchestral literature in which the wind section is used idiomatically:

1. as relief color or contrast to string passages;
2. in purely homophonic wind choir writing and chord spacings;
3. to clarify a gesture or a whole passage by the choices of colors;
4. in novel articulations;
5. with doublings of strings;
6. in contrapuntal examples for winds.

1. Contrast or Relief Color

In the third movement of Brahms's *Second Symphony*, there is a very beautiful use of alternation or, in this case, of "melting" one section (winds) into another (strings). This familiar technique is an important tool for the orchestrator. Five measures before the end, the woodwind chord dissolves into a string chord; then, at the very end, the final chord is colored by a wind chord with slightly different voicing, but in a similar juxtaposition to the strings, as before.

Example VIII–18. Brahms, *Symphony No. 2*, third movement, last 8 measures



Another lovely example of this effective alternation of voices is the beginning of the first Trio in Schumann's *Symphony No. 1*. Here, a short gesture, initiated by the strings, alternates with winds, including first horns then trumpets, and serves as a unifying element in the movement. Note that whenever the choirs are first used separately and then together, a most satisfying sense of completion or resolution results.

Example VIII–19. Schumann, *Symphony No. 1*, third movement, mm. 49–73



Another short but famous example of "throwing the ball around" is very much in order. Beethoven was very fond of assigning little thematic gestures to different members of the winds and strings and then summing them up with a cadential tutti phrase. After the opening exposition of the main idea, and a bombastic tutti in the first movement of the *Third Symphony*, Beethoven provided instant contrast with a three-note gesture that is played at different pitch levels by oboe, clarinet, flute, and first violin twice, in that order. The third time, the oboe, followed by the clarinet and bassoon in octaves, introduces the summation gesture played by all the winds and strings, with the horns and trumpets providing the pedal dominant–tonic progression.

It may be important at this point to make an observation that any student of orchestration should keep in mind. Although there are

Example VIII–20. Beethoven, *Symphony No. 3*, first movement, mm. 38–57





exceptions, most of the great masters try to alter something, no matter how slightly, the *third* time they use the same orchestration. This is often true of any sequential material. It may be exactly the same voice, but, the third time it must be a bit different, in order to renew interest in the phrase. A principle like this, while not foolproof or absolute, is a good one to remember.

2. Homophonic Wind Choir Writing in Orchestral Music

The wind choir with or without horns was not widely used homophonically until the nineteenth century. From then on, we find many excellent examples of purely homophonic writing lasting as little as four measures, or encompassing very long passages.

For study purposes it is suggested that the student reduce each of the following examples for piano (VIII–32, 34, and 35) and analyze the doubling and spacing of each melodic line, each harmony, and the spacing of the chords, keeping in mind the registral characteristics of each wind instrument. The most important thing to remember is that the melody must come through (if it is important, that is) and not be obscured by the harmony. However, if the chord progression is the focal point of interest, then it must be orchestrated

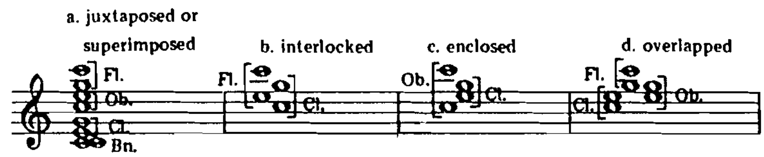
with the following in mind: shade (light or dark), dynamic (loud or soft), inversion (root position or inversion). These factors should influence the choice of instruments, as well as the spacing and doubling of the chordal passage.

Let us isolate a few chords before we look at the examples. Too many orchestration books give pat formulas for this task. Of course there are some obvious ways of spacing and doubling which are more effective than others. However, homophonic wind writing, doubling–spacing, and instrument selection have all been used by various composers in ways characteristic of their personal orchestration style. Here are some norms one can build upon:

Chords for winds in pairs may be voiced in four ways:

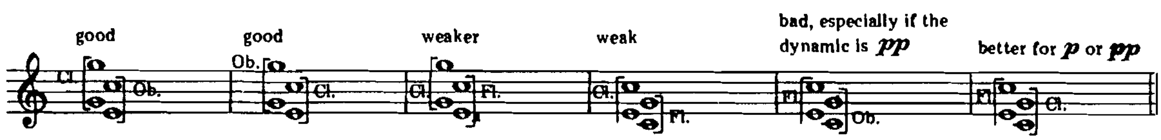
a. juxtaposed or superimposed one pair on the other;
b. interlocked;
c. enclosed;
d. overlapped.

Example VIII–21.



a. Juxtaposition is probably the most frequently used voicing, but one must be sure that the most prominent melody note is in a good register for the instrument to which it has been assigned.
b. Interlocking is a more imaginative voicing because it mixes the wind colors, but it has some greater registral dangers.

Example VIII–22



c. Enclosing another instrument may present similar problems, namely the prominence of some registers on some instruments and the lack of carrying power in other registers.

Example VIII–23

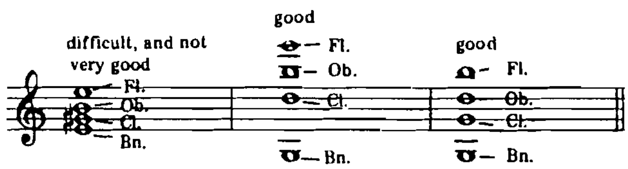


Also, the third example encloses the oboe within two different timbres, which not only gives better balance since the clarinet is stronger on the fourth-line D than the second flute, but provides added color interest.

d. Overlapping was in much greater use in the past than it is today, for doubling instruments at the unison (discussed earlier) robs the timbral characteristics from both and usually only results in a stronger pitch. In full-orchestra tutti this practice is still common.

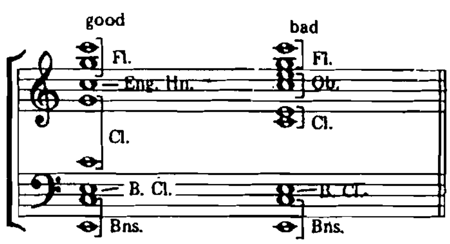
Why have we not mentioned a chord where each note has a different timbre? Because such chords are difficult to balance, and unless the work is for small orchestra with single winds, this kind of writing is avoided. There are tuning difficulties to boot; however, a chord that is spaced wider is easier to handle with four different colors than a close chord, since each instrument can be placed in its most advantageous register.

Example VIII–24



One should notice that the greater gaps exist between the bass and the next highest voice. This spacing is preferred, and it is usual to voice the upper woodwinds or the upper notes of the chord in close position. Special consideration should also be given to the spacing of a first inversion in which the third (bass) should be doubled toward the bottom rather than the top. The "open" quality of the first inversion is thus preserved.

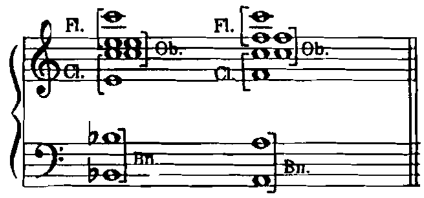
Example VIII–25



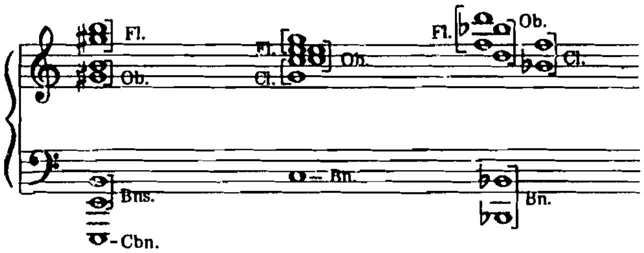
When multiples of three and four instruments are used in a wind section, the same principles of juxtaposition, interlocking, enclosing, and overlapping are also operational. Even greater care must be given to assign pitches that are registrally and technically practical so as not to upset the balance of the chord or the flow of the melody.

As we mentioned, spacing is often a very personal matter. Here are a few examples of this:

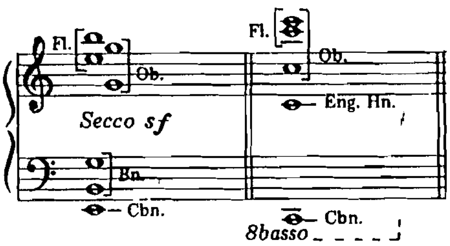
Example VIII–26. Typical Spacing in a Beethoven Work



Example VIII–27. Spacing found in many 19th-century works

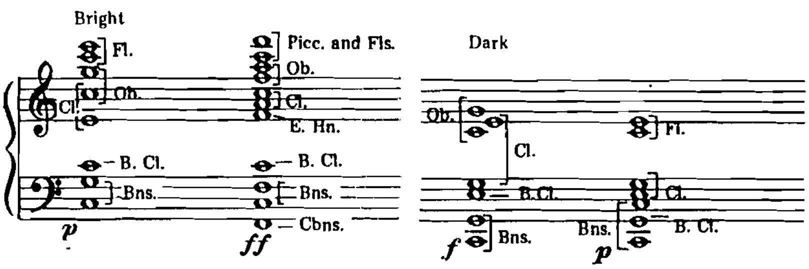


Example VIII–28. Two Stravinsky Spacings



The bright or dark hues result from the choice of instruments and the position of the chord. Here are a few examples:

Example VIII–29



FOR CLASS DISCUSSION

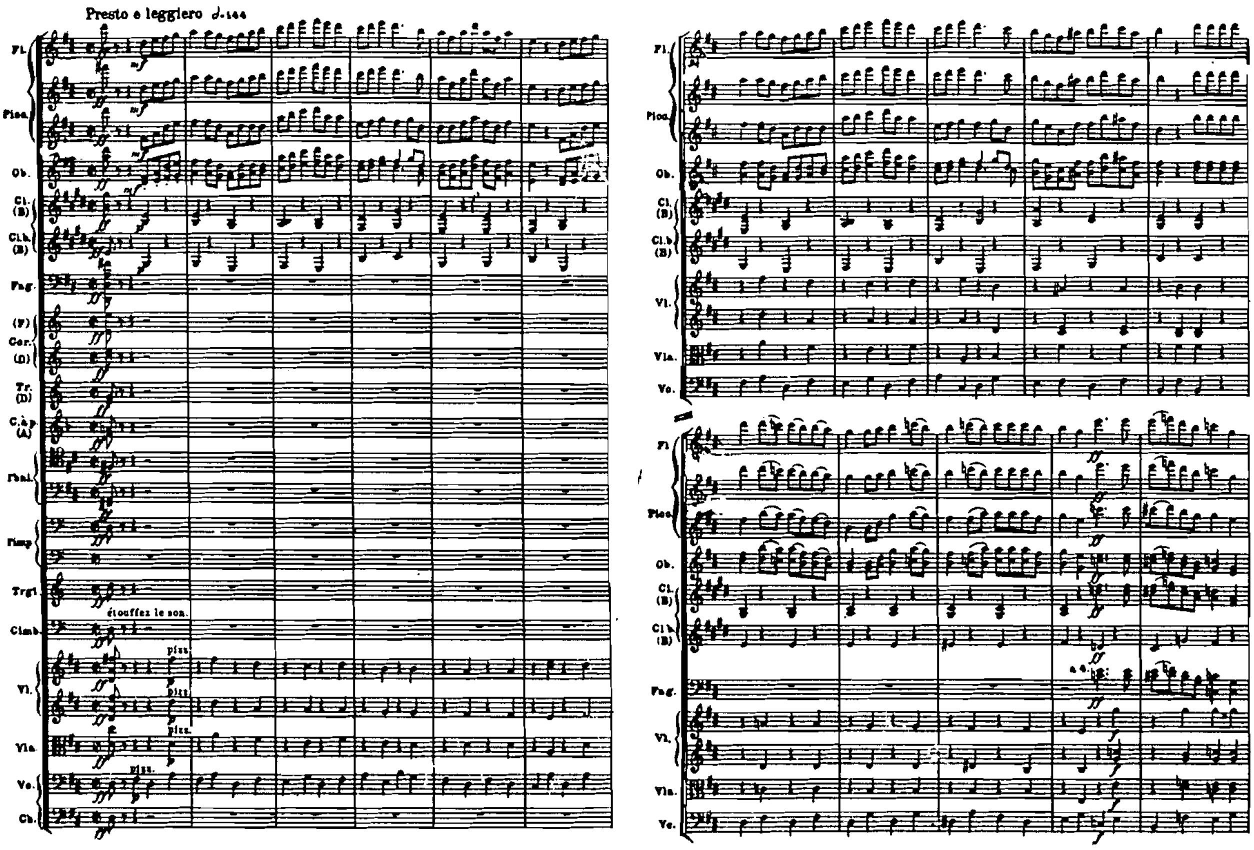
Study these four homophonic excerpts from the orchestral literature:

a. A fast passage from the end of the Minuet from the "Will o' the Wisp" section of Berlioz's *Damnation of Faust*. The two piccolos

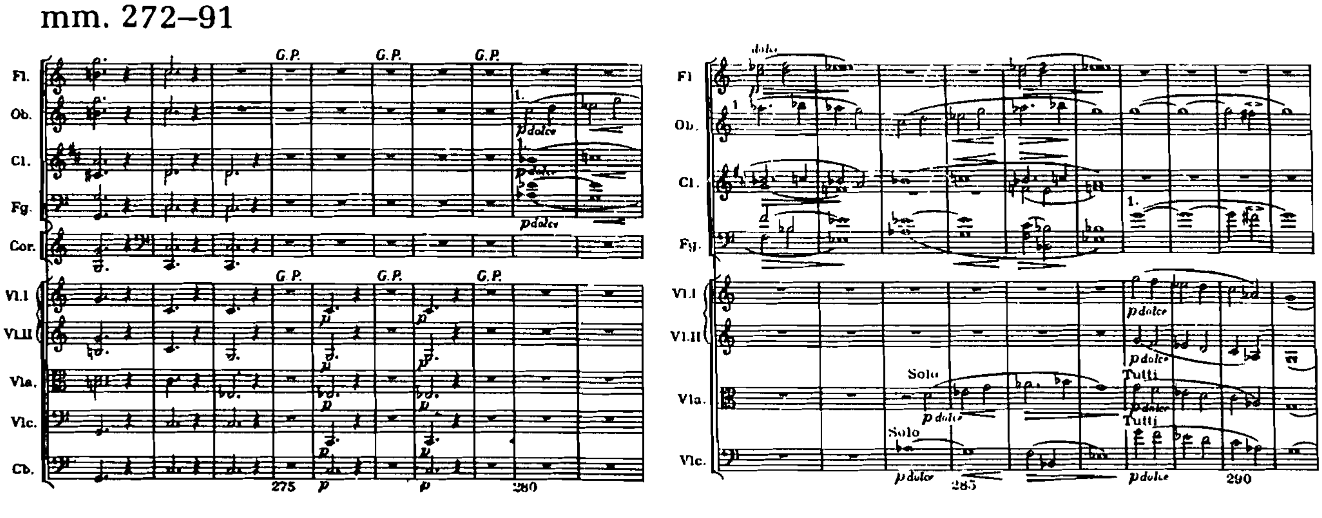
and flute doubled by the oboes play continually, while the two clarinets and bass clarinet provide a marchlike rhythmic-harmonic background. (See Example VIII–30.)

b. More characteristic of wind homophonic writing are these eight measures from the *Second Symphony* of Robert Schumann (Example VIII–31). The doubling of the oboe line at the octave by the violas and the doubling of the bass line by the cello make a smooth transition to the introduction of the entire string section. This color will be retained for several measures after the G octave is reached.

Example VIII–30. Berlioz, *The Damnation of Faust*, Minuet of the Will-o'-the-Wisps, mm. 125–40



Example VIII–31. Schumann, *Symphony No. 2*, fourth movement, mm. 272–91



c. The opening of William Schuman's *New England Triptych* is an excellent example of a simple hymn setting in which the winds simulate the organ a bit. The doublings and voicings are most important. The flute robs the oboe of some of its nasal quality to make the sound even more organlike. At m. 13, the bass clarinet enters, providing a welcome, if not radical, change from the mass wind color so well established. If he had introduced a cello or a bass, it would have spoiled the beginning of the new section and the novelty of hearing a string sound.

Example VIII–32. W. Schuman, *New England Triptych*, third movement (*Chester*), mm. 1–19

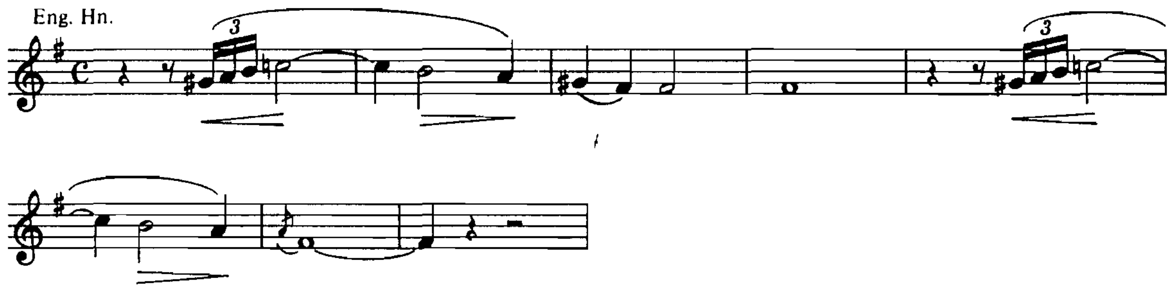


3. The Choice of One Color to Characterize or Clarify a Melodic Gesture or a Whole Melodic Passage

This technique is frequently used to represent a person or an object by an instrument in a tone poem. In more abstract cases, it may be the representation of an *idée fixe* or *Leitmotif* by a single instrument or a small group of instruments. Hundreds of examples exist, from Berlioz's use of the English horn in the *Symphonie fantastique* to the Strauss's horn in *Till Eulenspiegel* and the incredible bassoon opening in Stravinsky's *Sacre*. The clarinet, for instance, was thought to represent a nightingale by some nineteenth-century composers. The technique of assigning a motive or melody to a particular instrument or group of instruments remains valid today and can be an important device in bringing greater clarity to the form of a piece.

To illustrate the technique, we look at *Nuages*, the first movement of Debussy's *Nocturnes*. The first element of the work is a series of parallel chords introduced by clarinets and bassoons; the only contrasting gesture that appears in the entire piece is the following little figure, always played by the English horn.

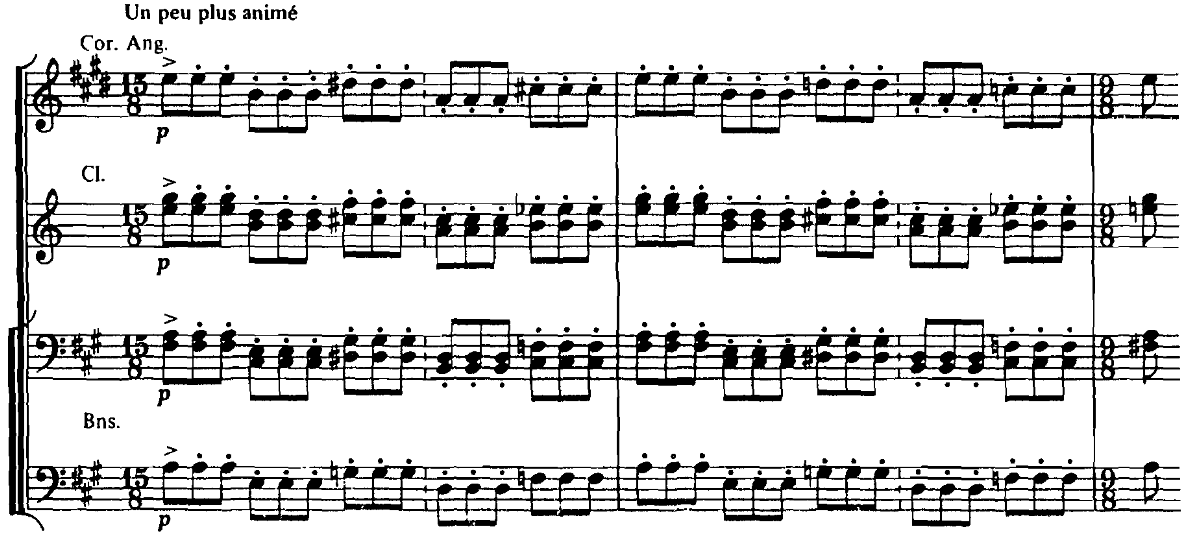
Example VIII–33. Debussy, *Nocturnes: Nuages*, mm. 21–28



If one considers the entire movement as an *A–B–A* form, this gesture helps clarify the form: it appears only in the *A* group of events, and neatly reintroduces these when the fragment returns after a long absence at the change of key (the return to the original key 23 measures before the end).

In the second *Nocturne*, *Fêtes*, there are similar techniques used. Debussy reserves certain colors for specific groups of instruments each time they appear. Especially noteworthy is the biting combination of instruments that expose the staccato figure at [2] (see Example VIII–34 on p. 246). This same combination is used again four measures later and then, significantly repeated when the recapitulation of the first part appears at mm. 208–10. While this movement is full of extremely colorful combinations, Debussy chose to reiterate a certain melodic fragment with the same instrument throughout the piece. This gives great clarity and unity not only to the orchestration but to the entire form of a work.

Example VIII–34. Debussy, *Nocturnes*: Fêtes, mm. 27–29



4. Some Novel Ideas concerning Articulation

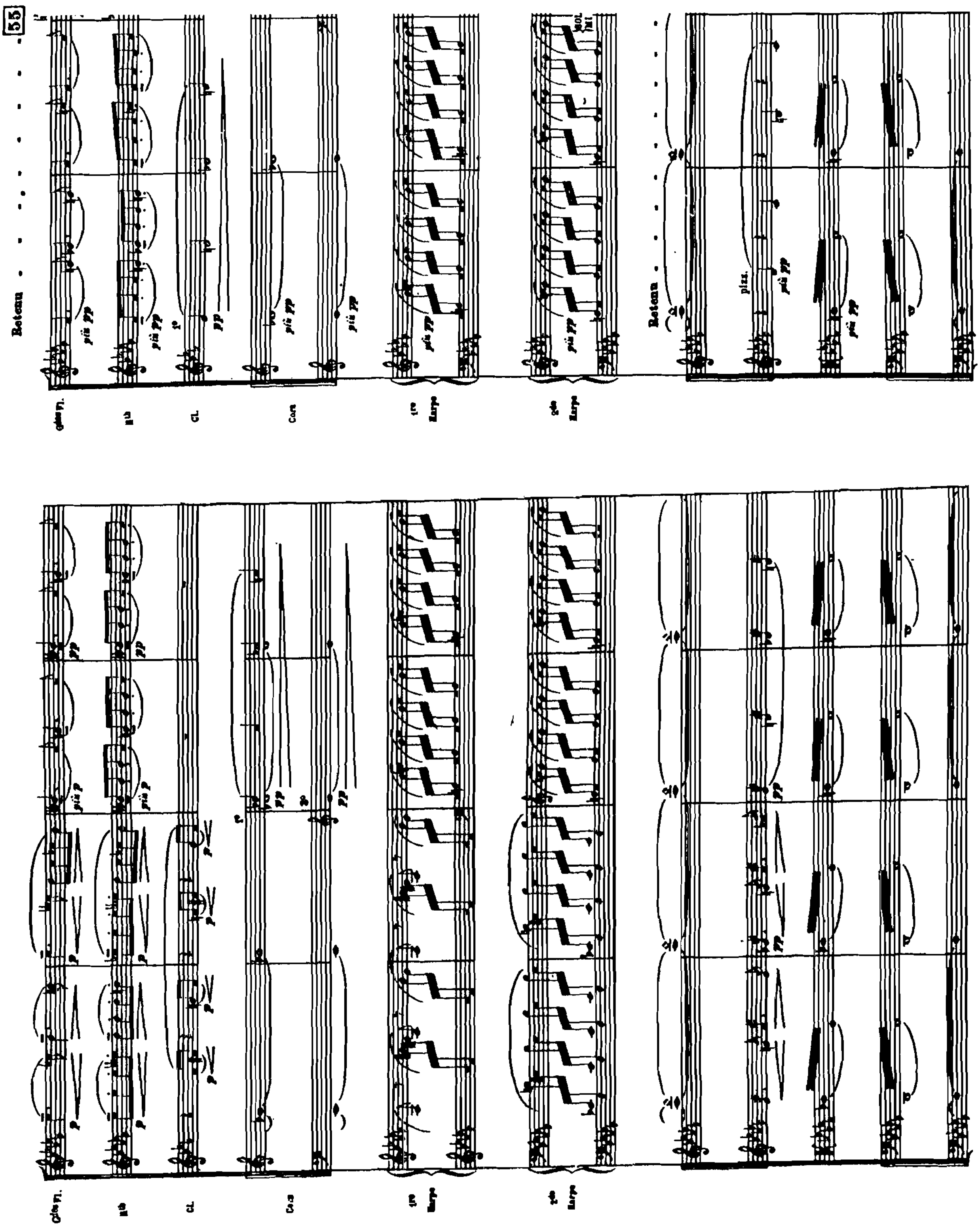
As we have discussed in the previous chapters on winds, there are basically two articulations possible—slurred or tongued. The tonguing may be single, double, or even triple. There is such a thing as hard and soft tonguing to give different kinds of articulations when one or the other is appropriate. Some twentieth-century composers have devised a number of novel articulation formulas which are most useful and worthy of study. We shall look at two excerpts from the literature which provide interesting ideas to ponder.

a. A long solo passage for flute and oboe in a "strange unison" taken from the final movement of Debussy's *La Mer.* Here the oboe "pulsates" quite a few of the sustained pitches of the tune to make it seem more animated than it would be if the oboe simply doubled the flute. Further, this technique draws attention to the difference between the quality of the flute and the oboe. As the two reach their lower register, the "pulsating" oboe gains prominence over the more placid flute. Debussy then creates an echo effect with English horn and piccolo in octaves and gives it an extra sheen by adding the Glockenspiel yet another octave higher at m. 181. Notice that in the "echo" only the English horn and the Glockenspiel articulate the first and third beats, while the English horn pulsates on afterbeats a little like a second violin or viola part. It certainly makes for an exciting and unusual presentation of this wonderful tune.

b. In the short excerpt from the first movement of Stravinsky's *Symphony of Psalms* on p. 249, the winds are divided so that one slurs a gesture while, at the same time, another tongues the same pitches. The only gesture that is entirely slurred is the sung melody

Example VIII–35. Debussy, *La Mer*, third movement, mm. 157–72





doubled by the first and third oboe, and the little arpeggio figure in the English horn. The overall effect of this marvelous accompaniment is similar to that of violins being divided, with the firsts playing arco while the seconds play the same pitches pizzicato.

Example VIII–36. Stravinsky, *Symphony of Psalms*, first movement, mm. 26–36



5. Winds as Doublers of Strings

The woodwind choir is often called upon to double the string choir, especially in tutti sections. In the eighteenth and nineteenth centuries, doublings of winds with strings "at pitch" in unison were very popular. Today, however, we feel that octave doublings are

more successful. (This may be the case because "at pitch" doublings are thought to detract from the clarity of a line and thicken the sound by muddying the overtones of both instruments.) Even though a passage may look as if the doubling is ineffective, the timbre would be changed without it. To experiment, let us take a doubling that seems unlikely and wasted and consider it first with the flute doubling the first violin and then without the doubling. The performance without doubling has neither the warmth nor richness of the alternative, especially as the line goes up.

Example VIII–37. Berlioz, *Symphonie fantastique*, third movement, mm. 19–36



Another unusually beautiful doubling is found at the beginning of the second movement of Brahm's *First Symphony*. We have already experienced the terrific effect of the two bassoons doubling the bass line in the opening theme of Mozart's overture to *The Marriage of Figaro*. Here we have a single bassoon doubling the opening theme in octaves with the first violins. This lends added warmth to the already rich harmony, and brings out the melody even more clearly despite the rather thick harmonic background.

Example VIII–38. Brahms, *Symphony No. 1* second movement, mm. 1–6



Now for a few examples of "normal" doubling of winds and strings:

a. A most effective beginning with the first violins doubled by the flutes and piccolo (an octave higher), the oboes, and clarinets filling out the upper-octave harmony by doubling the violas an octave higher, and the bassoons doubling the cellos at pitch plus an octave higher.

Example VIII–39. Dvořák, *Carnival Overture*, mm. 25–31



b. This excerpt starts with a very dark coloring, and only as it goes up does it get more and more brilliant. Of course, the trick is to keep the volume of the brass down enough to let the strings and winds through. This passage would sound much more exuberant if the piccolo were used an octave higher and doubled at the beginning, but then the subdued feeling would not be as pervasive, and that is obviously what the composer intended.

Example VIII–40. Tchaikovsky, Symphony No. 6, first movement, mm. 237–44



c. Here is quiet doubling at its best. A completely restful summation of two previous phrases, one for strings alone, the other for winds alone. At this point they come together for a third statement preceeding the final coda. Notice the voicing with the violas above the second violins for the first four measures. The second violins therefore need the heavy doubling of the second clarinet and the muted horn. Also, mark the way Copland orchestrates a diminuendo by cutting out the first oboe in the fifth measure, for it honks too much in that extreme low register, and substitutes for it the quiet, rich sound of the second flute to complete first violin doubling. It is interesting

Example VIII–41. Copland, *Appalachian Spring,* [70]–[71]



that the horn, which doubles the second violin for seven measures, switches at the end to emphasize the third of the chord, E. Without a dominant note (G) in the chord, it is a relative of the famous final chord of the *Symphony of Psalms*, only very quiet, dark, and subdued compared to the bright spacing in the Stravinsky work.

6. Contrapuntal Writing for Winds

Since the winds in the orchestra were not a prime factor in either the Baroque or the Classical periods, there are not many examples of fugal or imitative composition written specifically for the wind section in the orchestral repertory. Of course there are hundreds of instances where individual winds play imitatively with strings or other wind instruments. However, since each of the woodwinds has such a unique color, contrapuntal writing, especially rhythmical, is very effective. Here are four very different kinds of contrapuntal examples for winds from the orchestral literature.

a. This passage needs little explanation. Its marvelous woodwind imitation adds to the happy nature of the phrase.

Example VIII–42. Mozart, *Symphony No. 38*, third movement, mm. 120–38





b. Here is one of the few full-fledged fugue expositions exclusively for woodwinds, making full use of the registral differences of the choir and giving a good opportunity to study the sound of two like instruments playing in unison. A most effective and beloved piece which should tell us that it is quite possible to write such contrapuntal passages for winds today.

Example VIII–43. Britten, *The Young Person's Guide to the Orchestra*, Fugue, mm. 1–55




C
D
Picc.
Flts. I & II
Oboes I & II
Clts. in B♭ I & II
Bsns. I & II
a 2
(PP)
mf
cresc.
f
PP
p
ff



c. Probably three of the most ingenious pages in all of the orchestral repertoire, this is counterpoint in the most sophisticated manner. Here, almost each instrument has an entirely separate part at all times except for a few homophonic measures. The effect evokes the sensation of listening to the sound of nature on a spring night. Nothing seems symmetrical, yet everything is perfectly notated in 2/4 and 3/4 time. The extreme rhythmic variation in the parts gives that magnificent freedom. Even though there are so many diverse parts, the excerpt is very clear, because Stravinsky has orchestrated each gesture in the best register of each instrument. There are no "gimmicks." The fluttertongue sounds just right, as does the mixing of rhythms three against two, four against six, etc. Notice also a typical Stravinsky device, the division of grace notes: in m. 40 the first clarinet plays the grace note on the first beat, the second on the third, the first on the fifth, etc. This makes the grace notes fresher, for the same person is not worn out by repeating the same figure constantly; also, each player articulates just a bit differently, so each grace note is enhanced. Stravinsky uses this division of grace notes on many similar occasions, notably in *Petrushka*.

Study the excerpt beginning on p. 259 very carefully and listen to it often, since it contains some of the most thoughtful and colorful wind writing ever written and is perhaps the apex of contrapuntal writing in the twentieth century. The beautiful divided bass harmonics in m. 58 add a mysterious texture to the whole.

NEW TECHNIQUES

Every chapter in a book like this must be open-ended, since composers are constantly experimenting with new sounds and fresh approaches to all instruments, woodwinds in particular. The hundreds of new uses have not yet found their way into the new

Example VIII–44. Stravinsky, *Le Sacre du printemps*, "L'Adoration de la terre," mm. 40–60




51
Fl. gr. 1
Fl. alto
Ob. 1
Solo
mf stacc.
stacc.
Cl. picc. in Re
Solo
ff
Cl. in La 1 2
Cl. 2 in La muta in Cl. 2 in Sib
Fag. 1 2
C. Fag. 2
Cb. Solo
55
Fl. gr. 1 2
mf
Fl. alto
Ob. 1
Cl. picc. in Re
Solo
sempre ff
Cl. in La 1
très en dehors
Cl. in Sib 3
f
C. Fag. 1 2
mf
Vc. Solo 2
con sord. (arco)
6 Cb. Soli
con sord.
pizz.

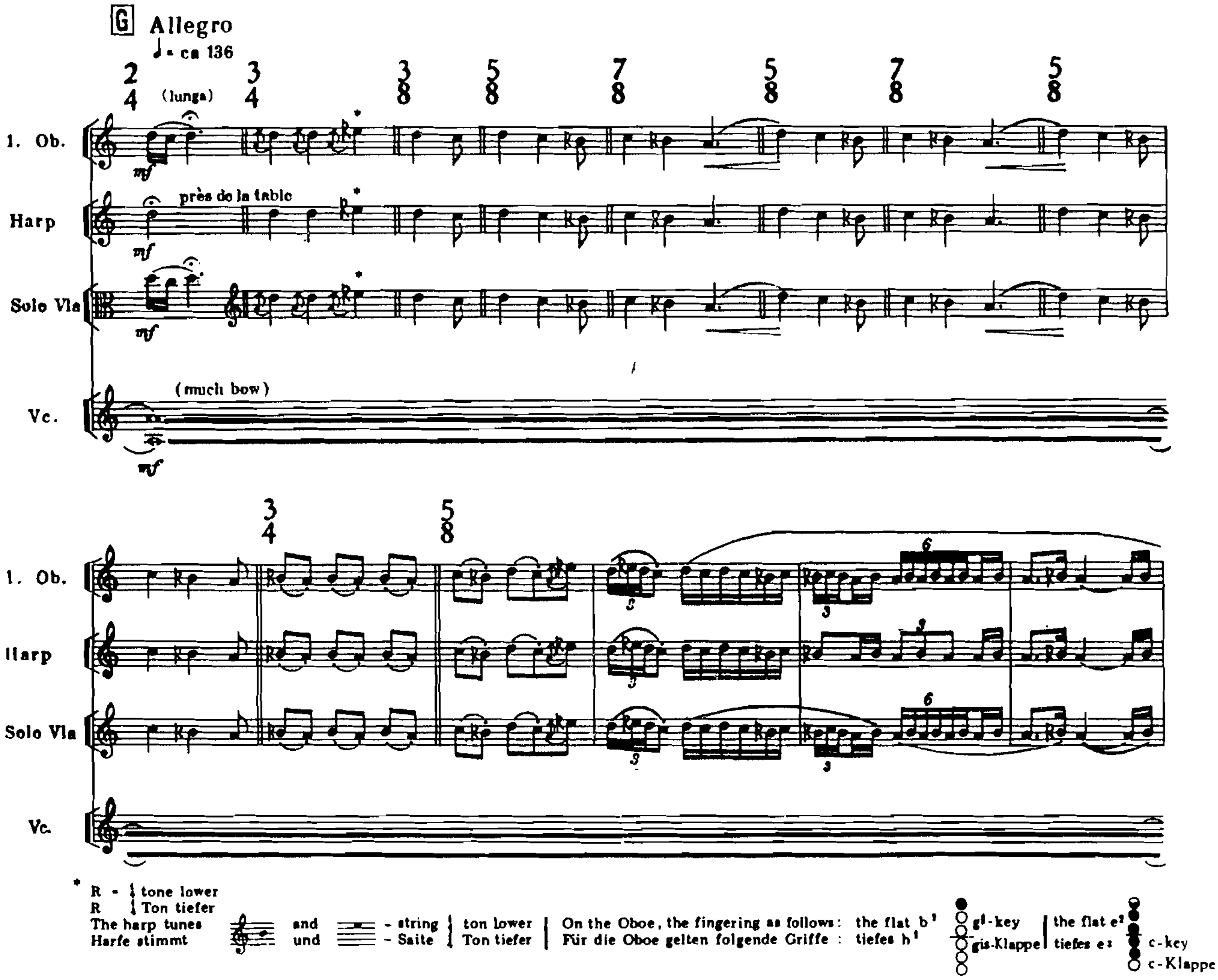


orchestral repertoire for the most part. That certainly does not mean that one should not try them. However, consultation with an experienced professional orchestral musician on the feasibility and practicability of a desired effect is the best assurance of its success in

performance. One of the most experienced orchestral composers of our time, Gunther Schuller, in one of his best works, experiments with the oboe in combination with harp and viola, and in an ingenious little trio gives an example of what can be done to enlarge techniques today. Here is a bit of this passage from Schuller's *Seven Studies on Themes of Paul Klee.*

Notice that specific instructions for the instruments are clearly given. This is an important addition to any score that requires unorthodox methods of production. The object here is to simulate the sound of an ethnic Arabic dance.

Example VIII–45. Schuller, *Seven Studies on Themes of Paul Klee,* "Arab Village," mm. 60–73

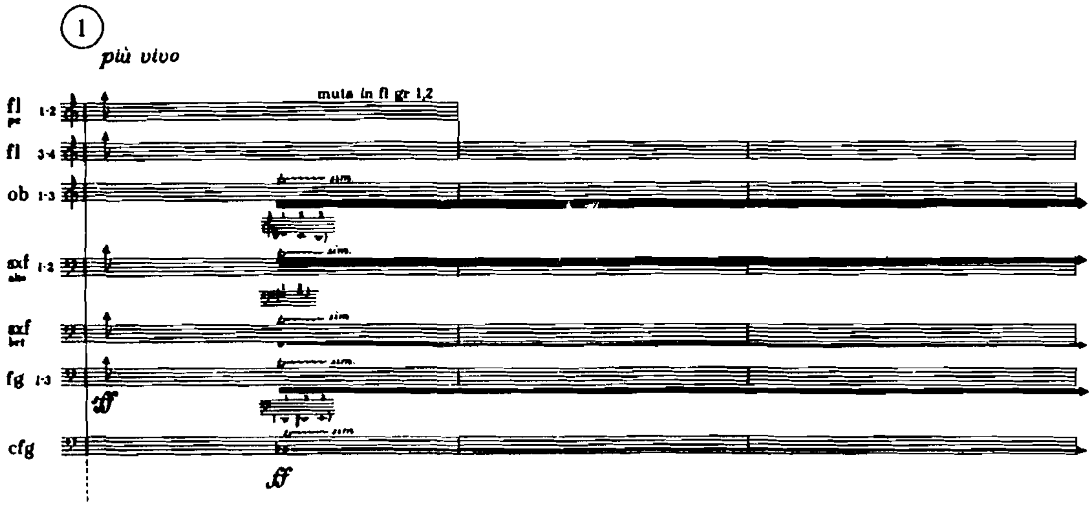


Most problems that arise in contemporary scores stem from notation that is foreign to the performer and is not explicitly explained at the beginning of each work. Here are two excerpts from contemporary Polish scores that require some brand-new effects:

1. Penderecki, *Dies irae*

Winds first play the highest pitch they are able to produce. Then they trill on the specified notes until the end of the dark line with arrow.

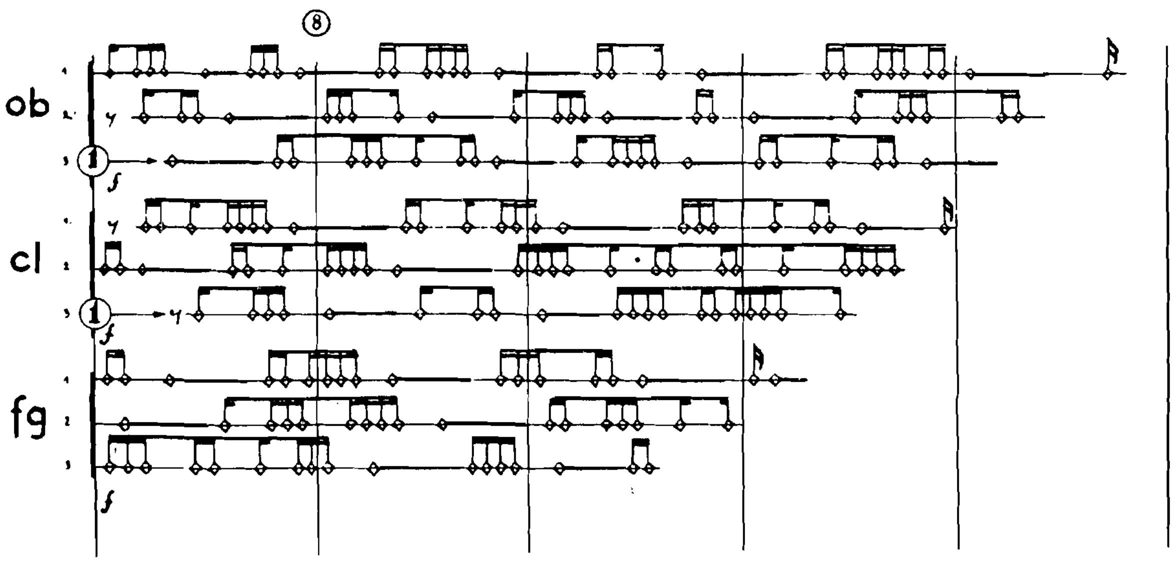
Example VIII–46. Penderecki, *Dies irae*, "Apocalypsis," mm. 2–4



2. Stachowski, *Irisation for Orchestra*

The composer asks the winds to remove their mouthpieces from their instruments and "play" through them.

Example VIII–47. Stachowski, *Irisation for Orchestra*, third movement, mm. 79–83



The solo and chamber music for woodwinds is more technically advanced than orchestral writing for these instruments. One important reason is acoustical, since many contemporary woodwind effects are very soft and therefore much more effective in smaller

halls and in smaller, more intimate groups. Two additional reasons are important to bear in mind when one wishes to use contemporary techniques that are as yet not universal: 1) only a few players are able (or in many cases willing) to perform them; 2) Some techniques are more successfully performed on certain makes of instruments. Instances of that are the multiphonics mentioned in some European texts, which are impossible or at least extremely difficult to produce on American instruments. Nevertheless, if a composer hears a certain sound in his inner ear and consults with an experienced professional, all things are possible.

Can orchestration be taught? Of course, if the ear is sharpened by familiarity of the orchestral repertoire and careful analysis of each interesting sound one hears for future use. The facts learned in this chapter should be kept in mind as we go on with the brasses and percussion and their combinations, culminating in the full orchestra in subsequent chapters.

Additional representative woodwind passages for listening and studying

Flute–Piccolo:

Bizet, *Carmen*, Entr'acte before Act IV (flute and cello)
Debussy, *Pelleas et Mélisande*, p. 141 of score (flute)
Ravel, *L'enfant et les sortilèges*, p. 67 of score (flute fluttertongue)
Ravel, *Piano Concerto*, p. 72 of score (low flute with bassoon)
Shostakovich, *Symphony No. 15*, beginning (long flute solo with strings)
Wagner, *Tristan und Isolde*, opening of Act II (flute solo)
Debussy, *Iberia*, p. 49 of score (piccolo)
Lutosławski, *Little Suite*, beginning (piccolo)
Ravel, *Piano Concerto*, beginning (piccolo)
Schoenberg, *Pierrot lunaire*, pp. 61–63 of score (piccolo)

Oboe–English Horn:

Honegger, *Symphony No. 1*, p. 59 of score (oboe then English horn and flute)
Shostakovich, *Symphony No.1*, third movement, pp. 46–47
Chou Wen-Chung, *Landscapes*, [4]–[7] (oboe and English horn)
Bach, *St. Matthew Passion*, opening (oboes doubled by flutes)
Piston, *Symphony No. 2*, [55]–[60] (1st oboe melody, 2nd oboe accompaniment)
Mozart, *Piano Concerto* K. 467, third movement, mm. 78–118 (typical classical use of oboe)
Schoenberg, *Kammersymphonie*, Op. 9B, mm. 285–330
Stravinsky, *Capriccio*, opening of second movement (typical Stravinsky scoring for double reeds)

Tchaikovsky, *Symphony No. 2*, third movement trio (oboes in combination with clarinets, bassoons, horns, then violins)

Barber, *School for Scandal*, Overture (oboe melody at [C], English horn at [H])

Clarinet–Bass Clarinet–E♭ or D Clarinet:

Mendelssohn, *Violin Concerto*, third movement, mm. 687–88 (echo effect)

Dvořák, *Symphony No. 9*, fourth movement, 2 mm. before 3 (long melody)

Toch, *Chinese Flute*, "Confucius" (E♭ clarinet used like a trumpet)

Bartók, *Concerto for Orchestra*, fourth movement, [84]–[120] (trills, tremolos for 3 clarinets)

Copland, *Symphony No. 3*, fourth movement from [112] to end (effective E♭ clarinet writing)

Copland, *Symphony No. 3*. Study second and fourth movements for most effective all-around woodwind section writing.

Stravinsky, *Oedipus Rex*, [100]–[107] (interesting 3 clarinet passages)

Sibelius, *Symphony No. 1*, beginning (long clarinet solo)

R. Strauss, *Ein Heldenleben*, [35]–[38] (tremolos)

Tchaikovsky, *Nutcracker Suite*, "Dance of the Sugarplum Fairies" (bass clarinet in low register)

Bassoon–Contrabassoon:

Beethoven, *Symphony No. 9*, last movement at *Andante maestoso* (2 bassoons and contrabassoon)

Bizet, *L'Arlésienne Suite No. 1*, first movement, mm. 120–37 (triplets)

Brahms, *Symphony No. 1*, first movement, mm. 9–15; last movement, mm. 274–80 (large skips)

Ravel, *Piano Concerto*, p. 13 of score (long melody)

Sibelius, *Symphony No. 5*, first movement, pp. 23–24 of score (upper register)

R. Strauss, *Ein Heldenleben*, [35]–[38] (tremolos)

Tchaikovsky, *Symphony No. 4*, second movement, m. 275 (high register)

Saxophone:

Gershwin, *An American in Paris*, p. 51 of the score

Milhaud, *La création du monde*, entire work

Petrassi, *Partita*, p. 13 of score

9

Introduction to Brass Instruments

Even though most of the instruments in the brass section of our modern symphony orchestra have been in use for several hundred years, the standardization of these instruments is a rather recent development and, in some cases, is still in flux. For example, Walter Piston in his orchestration book, published in 1952, states that trumpets in D "appear rarely" in the orchestra today. Since he said that, however, many trumpeters have taken up this instrument and it is once again frequently heard.

With today's increased interest in the accurate performance of older music, especially from before 1650, we face great problems concerning the brass instruments that were used in those days. If we wish to be truly authentic, we must be aware that the strange sound and pitch inaccuracy of the trumpets and horns, attributable to their rather primitive construction, were accepted phenomena of the times. Further, the character and gestures of the music were dictated by these limitations until around the middle of the nineteenth century.

It is therefore imperative to pay close attention to the evolution and development of this choir. Today, brass instruments suffer few of the limitations which formerly frustrated their players and are rapidly taking their places among the most agile and versatile members of the modern orchestra.

COMPOSITION OF THE BRASS SECTION

The brass section of the modern symphony orchestra is usually made up of four horns, three trumpets, three trombones, and a tuba. Larger numbers of these instruments may be employed, and some composers augment these basic instruments with cornets, euphoniums, and Wagner tubas. In some early nineteenth-century scores, we often find the outmoded ophicleide, whose parts are mostly performed on the tuba today.

While the brass choir is more homogeneous than the woodwind group, it would be altogether simplistic to make this an unqualified statement. Practically, there are two major divisions:

1. the horns
2. the trumpets, trombones, and tubas

This most important division of the instruments is a consequence of the way in which they are constructed with respect to the shape of the tube and the bore, as well as the small but radical differences in the shape and size of the mouthpiece.

A minor division is possible between the brass instruments when we consider the question of transposition:

1. transposing: horns and trumpets (cornets)
2. nontransposing: trombones and all tubas (euphoniums)

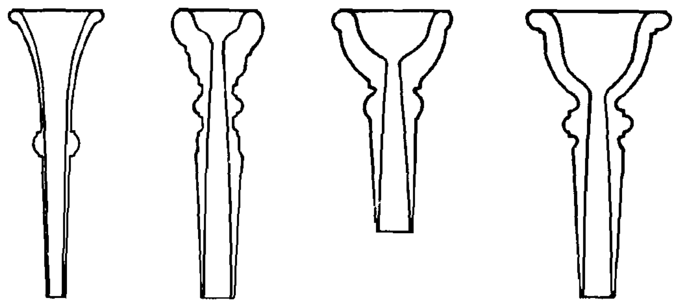
TONE PRODUCTION, ARTICULATION, TONGUING

Just as woodwind players use their reeds as a source of vibration to be amplified and channeled through the instrument, so do brass players use their lips to perform a similar function.

One is able to generalize about the embouchure on brass instruments in the following manner: the lips are loose for low notes and tighten as the player goes up into the higher registers. The timbre of the individual instrument depends on the size and shape of the mouthpiece. Forsyth says "the shallower the cup, the more brilliant the tone";* this is an excellent generalization to remember. Therefore, we can see in the illustration on p. 268 that the trumpets have a cuplike, shallow mouthpiece which makes their tone much more brilliant than the mellow horns, which are fitted with a funnel-shaped mouthpiece.

The problems of tonguing for brass instruments are similar to those

* Cecil Forsyth, *Orchestration* (New York: Macmillan, 1949), p. 90

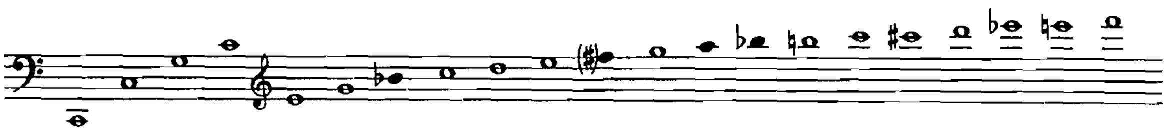


of the woodwinds. All variants of tonguing are available, and double- and triple-tonguing is feasible for all. A great variety of attacks are possible on all brass instruments, although as one considers the problems of each of these instruments closely, one will find that, for instance, because of the loose embouchure of some extremely low notes, certain attacks and articulations may be problematic. Conversely, the soft attacks and controlled articulations for the very high extreme register on most of the brass instruments are fiendishly difficult, because of the firmness of the lips and the velocity of the breath required to produce these notes. All this will be discussed in the systematic examination of the instruments of the brass choir.

OVERBLOWING AND THE PRINCIPLE OF THE HARMONIC SERIES

Early in the nineteenth century, trumpets and horns were not equipped with valves or pistons to produce the various pitches, but simply worked on the principle of overblowing the harmonic series. To restate the operative acoustical principle: The longer the tube, the lower the pitch of the fundamental, and vice versa. Let us take an eight-foot-long tube, which is theoretically capable of sounding the low C, and therefore produces the following harmonic series:

Example IX–1. Harmonic Series on C



The brass player isolates these pitches or partials of the harmonic series with his embouchure. The skill of the individual brass player is determined by his ability to find any notated pitch (or partial) by a combination of embouchure and breath control. In other words, he has to have a mental image of what the pitch sounds like and then what the pitch feels like while he is performing it. One should keep

in mind some general problems faced when playing natural instruments, that is, brass instruments which have no valves or pistons to change the pitches. They are entirely dependent on the length of the tube for their harmonic series and the skill of the performer to find each prescribed pitch:

1. Only the notes of the particular harmonic series can be sounded on an instrument with a tube of a given length. For example, on the instrument which produces the harmonic series and therefore the partials of the above example, the performer could not, under normal circumstances, play the following notes or any of their chromatic alterings:*

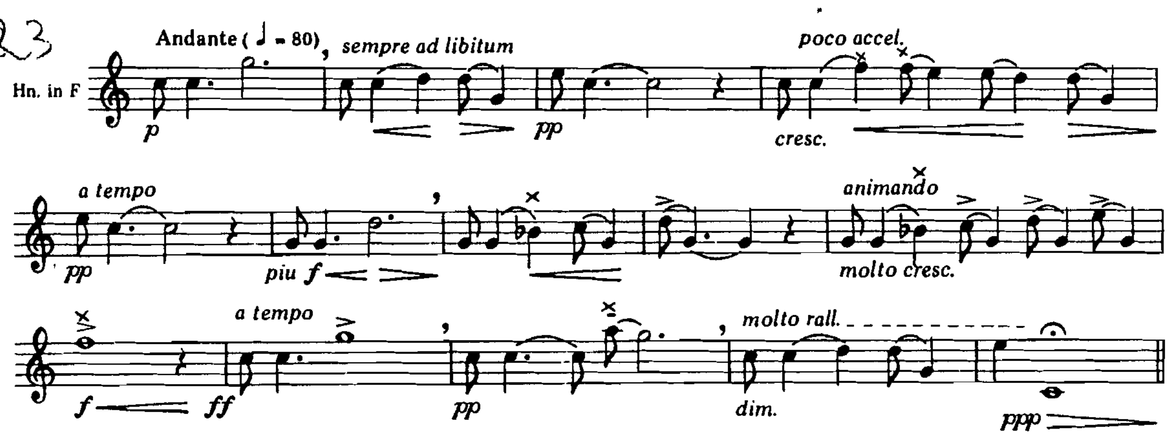
Example IX–2



2. While theoretically all pitches are producible in the harmonic series, most players cannot produce pitches above the sixteenth partial.

3. There are certain partials which are out of tune compared with our present tempered scale when performed on natural instruments. This is especially true of the seventh, eleventh, thirteenth, and fourteenth partials, but upon close examination, we shall also find that the two major seconds between eight, nine, and ten are intervals of unequal length. In our day, some composers want this out-of-tune sound as a special effect. Notice in this example from Benjamin Britten's *Serenade* that the pitches with crosses over them are out of tune because Britten specifies that this passage be played on an "open" horn utilizing, if necessary, the modern horn by playing the series on F without manipulating the notes by means of the valves.

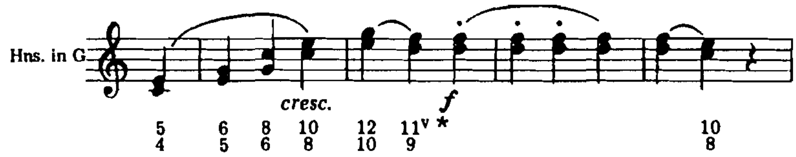
Example IX–3. Britten, *Serenade*, mm. 1–14



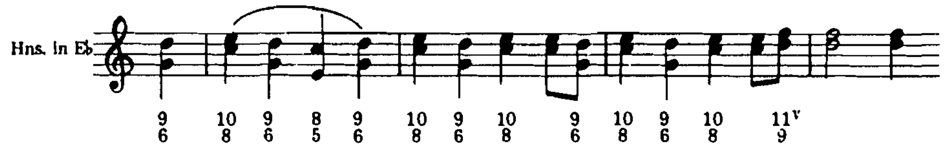
* As we shall find out later, there were ways in which skilled performers overcame this problem, but many times sacrificing good intonation.

4. For beginners, the fundamental is usually difficult to produce, and the Classical composers seldom ask for notes higher than the twelfth partial. Here are three typical passages from the Classical literature, one of which does demand the higher partials:

Example IX–4. Mozart, *Symphony No. 40*, third movement, mm. 74–78



Example IX–5. Beethoven, *Piano Concerto No. 5*, first movement, mm. 43–47



Example IX–6. Beethoven, *Symphony No. 3*, third movement, mm. 174–80



5. Bach, Handel, Vivaldi, Telemann, and their Baroque contemporaries were very daring and demanding when it came to brass writing, and the virtuosos of their day made the upper range a particular specialty. When the player found certain notes out of tune or "missing" from the particular harmonic series, he "found" the missing note or corrected the bad notes by varying the existing pitches by means of his embouchure. In the case of the horn, the right hand was placed into the bell of the instrument, in effect shortening the tube and raising the pitch. The following passage written for trumpet in F (transposing a perfect fourth up) will give an example of a passage in which the player *had* to have difficulty with at least two pitches and had to alter them to maintain the tempo successfully:

* v means pitch to be adjusted by the player.

Example IX–7. Bach, *Brandenburg Concerto No. 2*, first movement, mm. 29–30



The F in the passage had to be performed by flatting the eleventh partial, and the A was so badly out of tune that one had to play the fourteenth partial and flatten it.

RANGE

The ranges of each of the brass instruments will be discussed in great detail in the individual sections for each instrument. However, it is most important to remember the following principle in connection with the harmonic series: A wider bore facilitates the production of the lower partials, while a narrow bore is much more expeditious for producing the higher harmonics.

CROOKS, VALVES, AND SLIDES

Brass instruments were originally outdoor instruments used for hunting, military functions, and civil disasters. They were also used in the church, but until the sixteenth century, only for occasions that demanded fanfares. It was not possible to consider these instruments for serious use in composed music until their unwieldy shapes and mechanisms were controlled and altered.

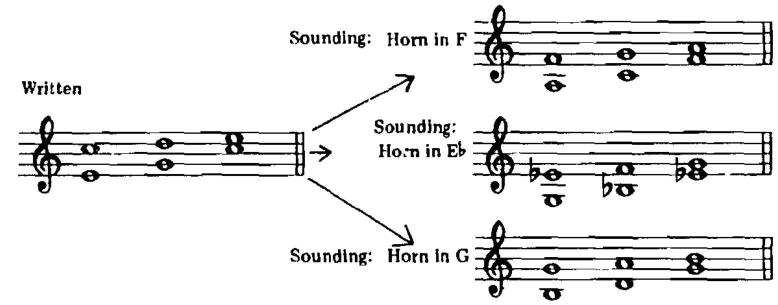
By Haydn's time, a mechanism was invented which allowed the trumpets and horns to go beyond the limits of a single harmonic series. Remember, the pitch of the fundamental depends on the length of the tube. It was found that by adding extra tubing, the player could produce another series on the same instrument. This added pipe, called a *crook*, was U-shaped and inserted somewhere into the original tube.

The composer was then able to decide what series he wanted the instrument to start the piece in, and the player, given a little time, could change the series anywhere in the piece by inserting a crook and then performing in another key. However, he was still limited to the notes in the harmonic series of the new length of tubing.

Both trumpets and horns remained transposing instruments, since it was much easier for the performer to continue to read and finger

in C and let the composer (and the crook) take care of the exact transposition. So the following "horn fifths" sound according to their transpositions in this manner:

Example IX–8



The next improvement in the development of the horn and the trumpet was the invention of the valve (both rotary and piston) early in the nineteenth century, but it was not until the middle of that century that the system was perfected and gained acceptance by the performers.

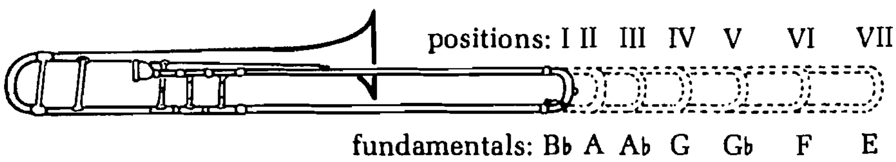
The principle functions in this manner: Three coiled tubes are permanently attached to the main tube inside the main loop. Each of the attached coils can be activated, or joined, to the main stream of air by a valve which is easily operable by the performer's left hand. In other words, the piston, or lever, activating the extra tubing, accomplishes instantly what the changing of crooks did previously. There are usually three valves on the trumpet and horn. The first valve is the one closest to the player, the middle valve is called the second, and the one furthest away from the player is called the third valve. Tubas often have a fourth valve, which lowers the pitch a perfect fourth. Two or more valves may be depressed at the same time.

By depressing the first valve (alone), the pitch of the whole series is lowered a whole step. Depressing the second valve (alone) lowers the series a semitone. Depressing the third valve (alone) lowers the series a tone and a half. So valves 2 and 3 depressed would equal the lowering of the pitch by a major third, and so on.

This principle has made these two important brass instruments of the orchestra completely chromatic and able to produce all the pitches between the "open" partials of the fundamental series.

The trombone in the fifteenth century closely resembled its modern counterpart. It is completely chromatic, because it permits the player to change the length of the tubing by means of a slide. The instrument is made of two U-shaped pieces, one of which slides into the other. Even though the trombonist still depends on his control of the overtone series, he is able to change the total length of the

tube with precision and perfect intonation. There are seven positions of the slide of the tenor trombone, as shown in the following diagram:



Positions of the Trombone Slide

These, of course, provide seven different harmonic series as well as seven fundamentals. Remember, the change of position can be accomplished almost instantaneously with practice.

Note how the valves in their various combinations on the trumpet and horn correspond to the trombone positions:

Valves Depressed	*Interval by Which Pitch is Lowered*	*Corresponding Trombone Slide Position*
None	none	first
No. 2	semitone	second
No. 1	whole tone	third
No. 3, or nos. 1 and 2	minor third	fourth
Nos. 2 and 3	major third	fifth
Nos. 1 and 3	perfect fourth	sixth
Nos. 1, 2, and 3	augmented fourth	seventh

FINE TUNING

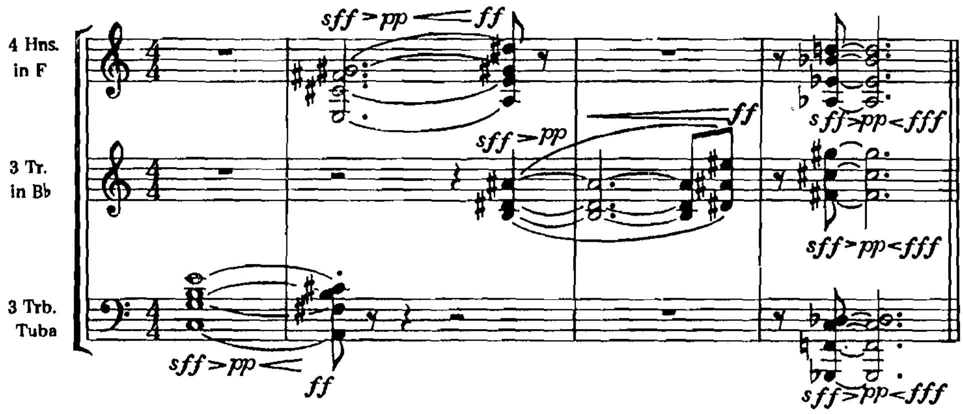
Each brass instrument has a tuning slide as part of its mechanism to make small pitch adjustments when necessary. Pulling out the tuning slide will add tubing to the instrument and, therefore, flatten the pitch, while pushing the slide in will raise the pitch slightly by shortening the tube. These pitch adjustments by the tuning slide are very slight. If greater discrepancies in pitch exist, the valve slides have to be adjusted.

COMMON CHARACTERISTICS AND EFFECTS ON ALL BRASS INSTRUMENTS

Different Attacks

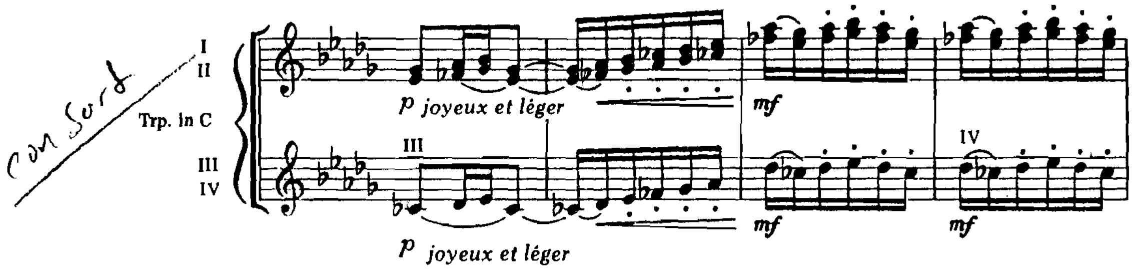
1. Sforzando and the *forte-piano* attack

Example IX–9



2. Light, soft, fast tonguing

Example IX–10. Debussy, *Jeux*, 2 measures after 67 to 68



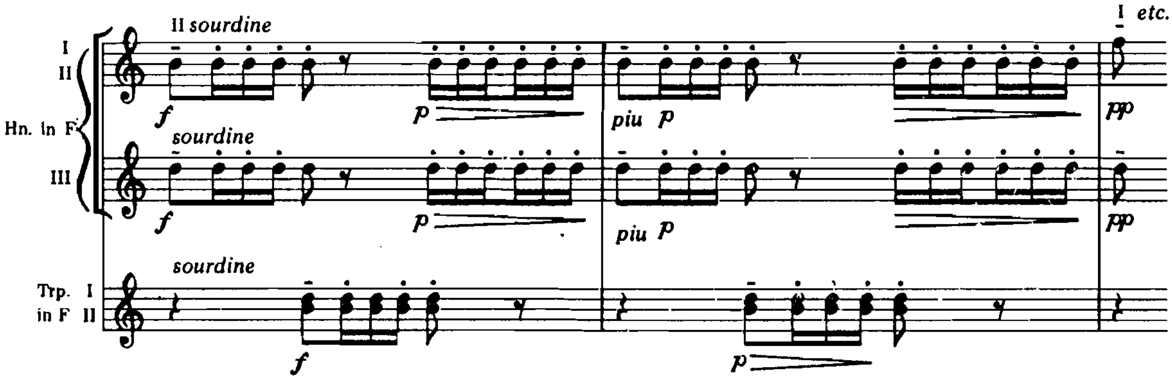
3. Double-tonguing, which is executed either *ta-ka* or *te-ka*

Example IX–11. Rimsky-Korsakov, *Scheherazade*, fourth movement, mm. 452–56



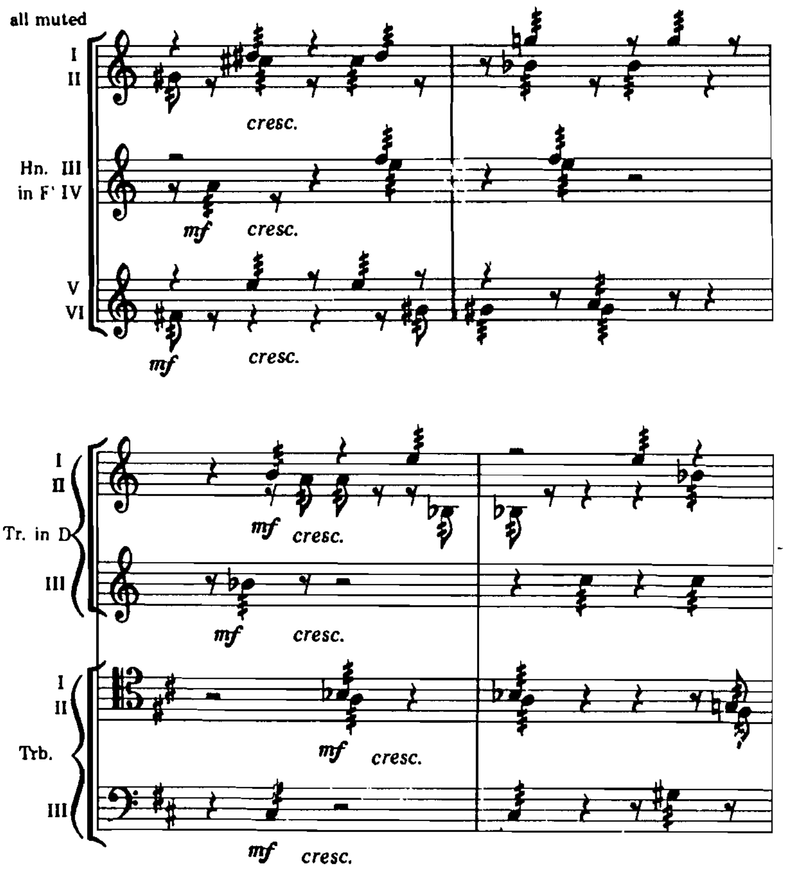
4. Triple-tonguing, which is executed *ta-ka-ta* or *ta-ta-ka*

Example IX–12. Debussy, *La Mer*, second movement, mm. 104–6



5. Fluttertonguing (Notice that the notation is similar to the designation of fluttertonguing for woodwinds.)

Example IX–13. Strauss, *Don Quixote*, Variation II, mm. 18–19



Fluttertonguing is very effective on all brass instruments and is quite easy to produce on all of them.

Breathing and Phrasing

The brass instruments require a great deal more wind than the woodwinds. Keeping in mind that playing these instruments is rather taxing, one should allow frequent intervals of rest for the brass players so their lips can recuperate and they can catch their breath.

Phrasing is very much as it is for woodwinds. If a passage is not slurred, it will be tongued, meaning each note will be articulated separately. On the other hand, all slurred phrases are performed on one breath. In a loud passage one should not phrase too many notes on one breath in a slow tempo, for it does take more breath to play loudly than softly.

Dynamic Range

The brass section of the orchestra has great dynamic power. So much so, in fact, that the orchestrator must always keep the balance of brass versus woodwinds and string in mind, since the full force of a brass section can obliterate the rest of the orchestra. The question of balance will be discussed at greater length later in the book, when combinations of choirs are explored. However, it must be stated here that at the other end of the dynamic scale, the brass section cannot be expected to play as softly as the strings or winds, although the *pianissimo* dynamic of a nonmuted brass section is a unique and most effective orchestral effect.

Example IX–14. Strauss, *Don Juan*, mm. 37–40

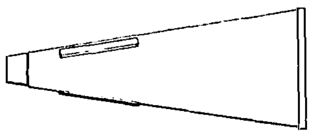


Mutes

All brass instruments can be muted. Muting can create a *pianissimo* that is incredibly soft; however, all mutes change the character of both sound and tonal color quite a bit. There is a variety of mutes for the trumpet and the trombone, but only one that is practical for the horn and one for the tuba. There are also mutes for euphoniums and Wagner tubas. The horn mute is very special for it is a transposing device; when a horn is "stopped" with the right hand, the pitch is altered. The player must therefore adjust that hand in order to achieve the desired pitch. With the mute, this problem does not exist for the pitch that is played is the pitch that sounds. A brass mute is a cone-shaped plug, which is inserted in the bell of the instrument. On its sides there are small blocks of cork which prevent the mute from fitting too tightly against the sides of the bell and make it easy to insert and to remove.

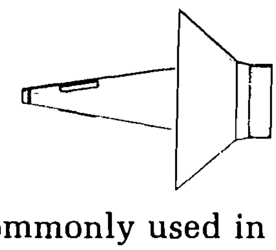
The horn can achieve a muted affect by hand-stopping, that is, pushing the hand tightly into the bell. In that case, the pitch is also raised, and the horn player needs to compensate for that elevation in pitch by fingering a note one half step lower. If the horn uses a commercial mute, the muting becomes nontransposing.

Here are some of the different kinds of mutes available for trumpets and trombones. While trumpet players usually carry several mutes with them, trombonists seldom have but one mute along, since the larger size of trombone mutes make them cumbersome to transport. If a trombonist carries any mute, it will be a straight one. For all other mutes, it is imperative to specify the exact name and any special instructions in the parts as well as the score.



1. Straight Mute

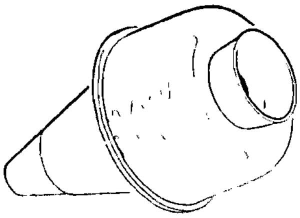
This is the mute that both trumpeters and trombonists use automatically as soon as *con sordino* is indicated in a work. One is able to play both softly and loudly with this mute. It is made of either fiberboard or metal. The fiber mute does not have quite as much "cutting edge" as the very poignant, straight metal mute, especially when playing *fortissimo*.



2. Cup Mute

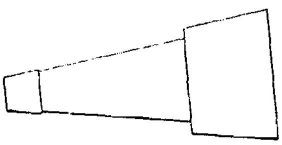
This mute is not commonly used in symphony orchestras, but is associated with jazz. The cup is adjusted to suit the style of the piece

being performed. When the whole section plays, the cup is usually open about an inch, while in some solo work or amplified playing, the cup is closed almost against the bell to produce a dark, muffled tone. As a whole, the cup mute can be used to produce colorless, ghostlike nasal sounds.



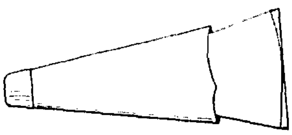
3. The Harmon or Wa-Wa Mute

This mute is made out of metal, and the end of it can be adjusted to produce a variety of sounds. It is seldom used in the symphony orchestra, except for comic effects, as in Lucien Caillset's arrangement of *Pop Goes the Weasel,* or "wa-wa" jazz effects, as in George Gershwin's *Rhapsody in Blue.* The characteristic sound of a trumpet with a fully assembled Harmon mute is penetrating and has a real shimmer. The mute sounds much duller when inserted in a trombone. The tone can be changed by removing the "cookie cutter" from the stem, extending the stem either halfway or all the way, and using one's hand to open and close the opening to obtain the "wa-wa" effect. In notation, the "+" sign means closing, the "O" sign means opening one's hand.



4. Whispa Mute

This is the softest of all the mutes. It sounds as if the instrument were somewhere off stage, so if it is played very softly, it is almost inaudible. The mute is made like the Harmon mute and works on the same principle. The sound is forced through a chamber filled with sound-absorbent material, and small holes allow a little of the sound to escape. It takes more effort to play the instrument, and extreme high notes are most difficult to produce.



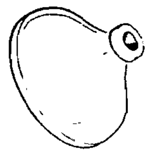
5. Solotone Mute

This mute also works on the Harmon mute principle, with all the air passing through the device, none escaping along the sides. The tone is diminished and then reinforced in the first chamber, leaving that chamber through a cardboard tube permanently mounted within. The tone is centered and well focused by a megaphone-shaped cone as it leaves the tube to produce a nasal sound, which seems to be coming through an old-fashioned radio or telephone.

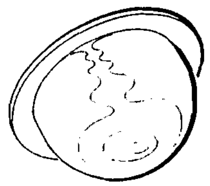
Ferde Grofé asks for this mute in the small-orchestra arrangement of the "On the Trail" movement of the *Grand Canyon Suite* (trombone solo).

6. Muting Devices other than Mutes

a. Plunger



This is simply a six-inch bowl with a small handle to muffle the sound or make it "stuffy." One can produce "popping" sounds by holding it very closely to the bell and playing very fast notes.



b. Hat or Derby

This device is usually used in jazz, but can be effectively used in any medium to reduce the intensity of the trumpet or trombone without distorting the sound in any way.

c. Hand over the Bell or Hand in the Bell

This is a way of damping the trumpet or trombone by hand and is not as effective as using mutes, although it can be used to affect pitch variations and muting at the same time, if desired. The composer specifying this device must be conscious of the fact that the pitch is definitely affected by putting one's hand inside the bell.

d. Into the Stand

Again, this is often demanded in jazz playing and can reduce the loudness and brilliance of both the trumpet and the trombone. The player focuses the bell of his instrument about two inches from the stand, thereby lowering the dynamic level.

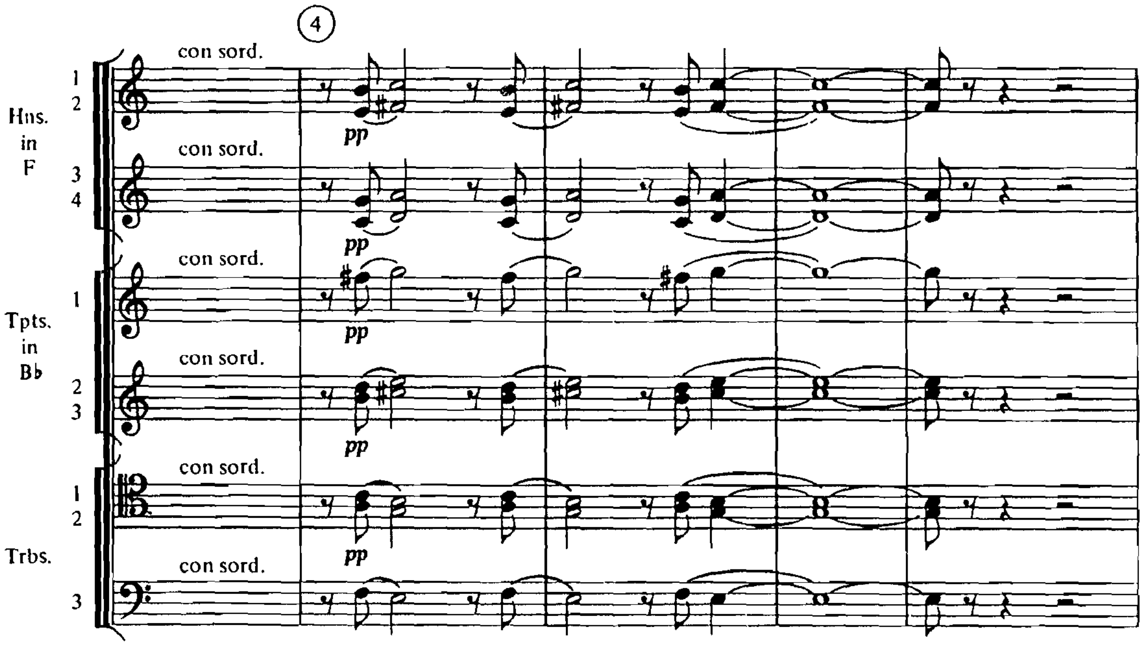
e. Cloth or Handkerchief in the Bell

A few twentieth-century composers have asked for this device. Charles Ives used it effectively for the trumpet in the *Unanswered Question*. Again, it reduces the volume and brilliance of the tone without causing any fluctuation in pitch and leaves the player in perfect control of his instrument, not having to strain for either high or low notes.

It is imperative to state once again that when muting devices are called for, the instructions to the performer must be explicitly notated in both the parts and the score.

Since mutes change the basic tonal color of each of the brass instruments and do not simply make the instrument softer, the effect of writing *fortissimo* muted passages for the entire brass section can be a most dynamic experience and is encountered quite often, especially in the music of the last hundred years.

Example IX–15. Vaughan Williams, *Symphony No. 6*, fourth movement, mm. 39–42



See also:

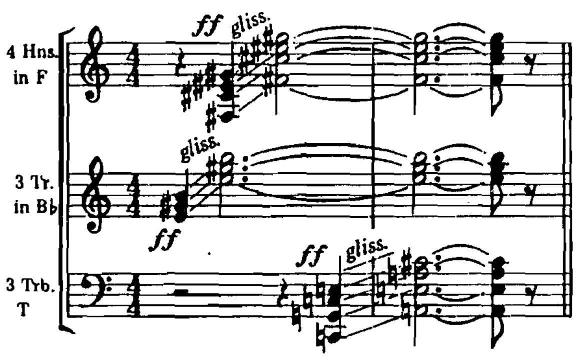
Copland, *Lincoln Portrait*, [200]–[201] (mezzo-forte muted brass)

Berg, *Lulu Suite*, pp. 70–75 (muted brass beginning softly and making a crescendo to fortissimo)

Glissandi

The horns and trumpets can produce a glissando by using a lip slur. These are most effective in the upper register, where the partials are close together; also, they are much easier slurring up- than downward, although jazz trumpeters are able to execute amazing glissandi in both directions. Both trumpet and horn glissandi are sweeping and very exciting gestures without being musically vulgar. The trombone, which is able to play glissandi with relative ease and in both directions, is almost too often called upon to show off this effect, which has by now become a well-worn cliché. Yet when it is appropriately used, it can be most apt. The tuba is able to perform glissandi, but not as easily as its other members of the brass family, and it is advised that the glissandi be upward, which is slightly easier to play than a downward glissando.

Example IX–16



Trills and Tremolos

The subject of trills and tremolos on the brass instruments is quite complicated, and therefore it will be dealt with in the individual instrument chapters. Suffice it to say that most brass instruments can perform some tremolos with success, and all are able to execute trills. On some instruments, lip-trills are preferable; on others, the pistons or valves are used; and still other players use combinations of both techniques. Obviously, the trombone player is only able to use lip-trills, sometimes also called lip-slurs.

Brass Instruments and the Written Orchestral Score

The arrangement of the brass choir on the orchestral page has some historic peculiarities. The brass section is placed right below the woodwinds on the score page in the following order:

Four Horns
Three Trumpets
Three Trombones
Tuba

Notice that the horns, which are really "the alto" of the brass section, have always been placed above the trumpets. This may be for the simple reason that the horns were regular members of the symphony orchestra before the trumpets; or possibly because, in the Classical orchestra, trumpets were used in combination with timpani and the two were placed in proximity. Both reasons are pure speculation, but seem logical explanations for a rather illogical arrangement.

Usually, horns and trumpets are written without key signatures. Of course, in older music where the trumpet and horn were usually playing in the key of the piece, but notated in C, this was logical.

However, this became such common practice that in most scores even today the tradition is observed and all the accidentals marked as they occur, rather than by a key signature. Most performers prefer this manner of notation. Trombone and tuba players are used to reading key signatures, since they have always been notated that way, especially in nineteenth-century scores.

The number of staffs per brass instrument is similar to the arrangement for winds. If there are four horns, use two staffs with first and second on one, third and fourth on the other. There are other special ways to arrange the four horns, which will be discussed in the following chapter.

The three trumpets are also placed on two staffs, with the first and second on one, while the third occupies the second staff. However, if the notation of the three trumpets is too complex to be clear on two staves, each trumpet may occupy its own staff. This practice is followed for horns as well.

The modern symphony orchestra usually has three trombones: two tenor trombones, which are written on one staff and a bass trombone on a separate one. In rare cases, the bass trombone shares a staff with the tuba.

There is usually only one tuba, and it has its own staff, though the third trombone will often be notated with the tuba, a practice that should be discouraged. When there are more tubas, they are usually notated on the same staff, while all euphoniums or Wagner tubas are placed between the bass trombone staff and the tuba staff.

10

Individual Brass Instruments

HORN

Corno (It.), *Cor* (Fr.)



Verne Reynolds, horn

In England and America, it has been a practice for a long time to call this instrument the "French horn." Why this nomenclature has been adopted is a mystery, for most of the developments in its construction were accomplished in Germany. The only possible explanation could be that in the earliest orchestral uses of the instrument (around 1710), especially in Germany and England, the horns were marked by the French designation *cor de chasse*, meaning hunting horns, although Bach often uses the term *corno da caccia*, meaning the same thing in Italian. However the designation of "French" horn came about is really not too important, but the term is not a correct one and should slowly but surely be retired.

What is important is that there are two distinct kinds of horns:

1. the natural horn, sometimes called hand horn
   corno naturale (It.); *cor simple* (Fr.); *Waldhorn* (Ger.)
2. the valve horn
   corno ventile (It.); *cor à pistons* (Fr.); *Ventilhorn* (Ger.)

The Natural Horn

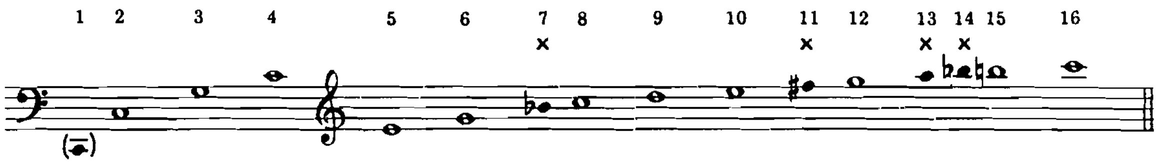
As discussed in the previous chapter, the natural horn is an open coil of brass tubing. It is a quarter of an inch in diameter at the small opening where the mouthpiece is inserted and then gently expands to about three inches at the throat of the bell. The bell then flares widely to about eleven inches in diameter. Crooks of various sizes are fitted at the end of the tube near the mouthpiece, or in later years, slid into the place where the tuning slide usually was placed.

The basic horn was an eight-foot-long tube with a fundamental of C and its overtone series. The following crooks, which changed the fundamental and the series, were the most popular during the eighteenth and early part of the nineteenth centuries:

Horn in	*Sounding (Transposition)*
B♭ alto	a major second lower than notated
A	a minor third lower than notated
A♭	a major third lower than notated
G	a perfect fourth lower than notated
F	a perfect fifth lower than notated
E	a minor sixth lower than notated
E♭	a major sixth lower than notated
D	a minor seventh lower than notated
C	at pitch if marked *C alto*; one octave lower than notated if marked *C basso*
B♭ basso	a major ninth lower than notated

Notice that all horns transpose downward, also that the words "alto" and "basso" appear. *Alto* in this case means high, and *basso* adds an octave to the regular alto transposition of the horn. If the word *alto* does not appear on the score, the transposition follows the table above. Besides the crooks and transpositions mentioned above, there were others less frequently used, such as A basso, G basso, and even B basso (Brahms, *Symphony No. 1*). Of the alto crooks some rare transpositions, such as horn in F♯ (Haydn, *Farewell Symphony*), horn in D♭ (Massenet, *Phaedre;* Bizet, *Carmen*), appear.

Example X–1. Range of the Natural Horn



The fundamental was usually not playable, so the player had eleven good notes available to him out of the possible sixteen partials. The notes with crosses over them were very badly out of tune and had to be adjusted by the hand in the bell if they were flat or by the embouchure if they were sharp. The term *hand horn* came into being because of the skill of the performers to play those partials in the harmonic series in tune by raising the pitches with their hand in the bell or by producing some pitches that did not even exist in the series.

As was mentioned in the previous chapter, most Classical composers seldom asked the horn player to produce any pitch beyond the twelfth partial. From Beethoven on, however, the higher partials were more commonly used. Even when composers such as Brahms and Wagner had access to valve horns, they continued to score for the natural horn.

Since the beginning of orchestral horn playing, the practice of segregating the horns into firsts and seconds has been followed. This segregation is not meant to imply that one player is inferior to the other, but rather that one (the first) plays "high horn" while the other "low horn." Toward the latter part of the eighteenth century, the range limitations of each of these horn parts was temporarily fixed. Following are the approximate ranges of the *cor alto* (first horn) and the *cor basso* (second horn):

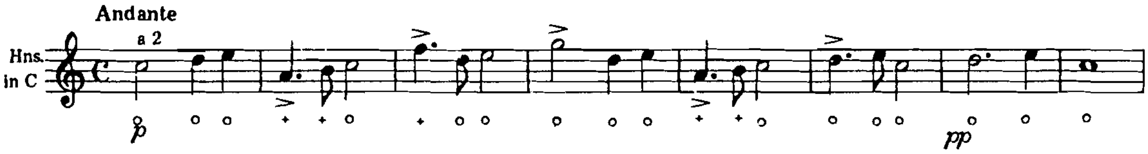
Example X–2



The lower horn players often used a larger mouthpiece in order to facilitate the playing of the lower notes.

Before we leave the subject of the natural horn, it is important to mention that the right hand in the bell was of course also used to stop or mute the horn by partially closing the throat of the horn inside the bell. This changed the quality of the sound or tone color of the instrument. It has been stated before that the insertion of the hand into the bell also corrected some pitch inaccuracies in the fundamental harmonic series. With great skill in embouchure control and right-hand manipulation, the hornist could successfully perform a passage such as this one from Schubert's *C-major Symphony.* All stopped notes are designated by placing a cross "+" over or under the note, while nonstopped notes have a circle under them.

Example X–3. Schubert, *Symphony No. 9,* first movement, mm. 1–8



The leading horn players of the late eighteenth and early nineteenth centuries preferred the brighter tone of the F crook compared to the more somber and darker timbre of the E♭ and D crooks. This most probably led to the adoption later in the nineteenth century of the basic F horn with valves as the prototype of the first completely chromatic instrument.

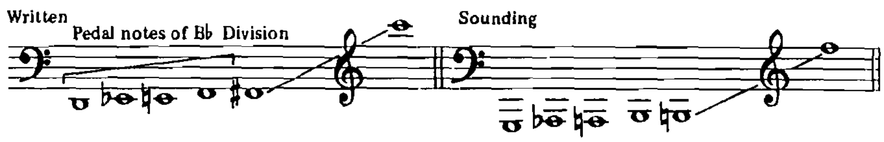
The Valve Horn

For a long period of roughly fifty years, the natural horn and the valve horn coexisted. Either composers and performers were prejudiced against the new "mechanical" instrument or they distrusted it; or, as was mentioned previously, the "hunting" outdoor quality of the natural horn was preferred. By the beginning of the twentieth century and especially with the chromatic complexities of music from Wagner on, the valve horn became the standard instrument for all symphony orchestras. Even though many of the beautiful horn passages in Brahms and Bruckner were written for hand horn, they certainly sound better and are more accurately in tune on the valve horn.

Our modern instrument is basically an F horn; however, an even greater improvement has been made, and these modern horns are what we call "double horns." This means that the instrument has two sets of tubing, that of the F horn, which is approximately twelve feet long; and a trigger worked by the left thumb cuts off three feet of

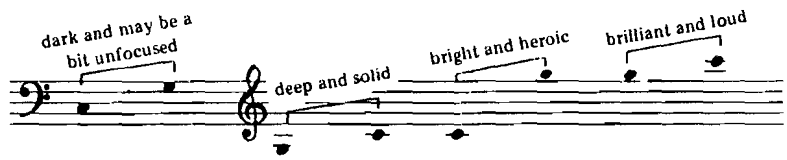
tubing, making it a B♭ alto horn (this is called the B♭ *division*). The double horn is clearly a most practical solution, since composers more and more frequently demanded the higher tessitura of the F horn. It was found that the higher partials were much easier to produce on the B♭ alto, with its shorter length of tubing. (On the B♭ horn the *twelfth* harmonic is the *sixteenth* partial on the F horn.) The composer should be aware of these facts, but does not have to notate for anything but Horn in F, and the performer will choose whether to play on the F or the B♭ part of his double horn.

Example X–4. Range: Horn in F



The modern horn has a very large range, but one cannot caution a composer enough about the great difficulties in producing certain notes. The lower register, especially the pedal tones of the B♭ division, are most difficult to produce and should be avoided in fast passages. These pitches are most effective when they are sustained or played in slow-moving passages. The rest of the range is quite agile, but it is most taxing to play in the higher register all the time, so periodic rests are most welcome.

Example X–5. Register Characteristics: Horn in F (Written Pitches)



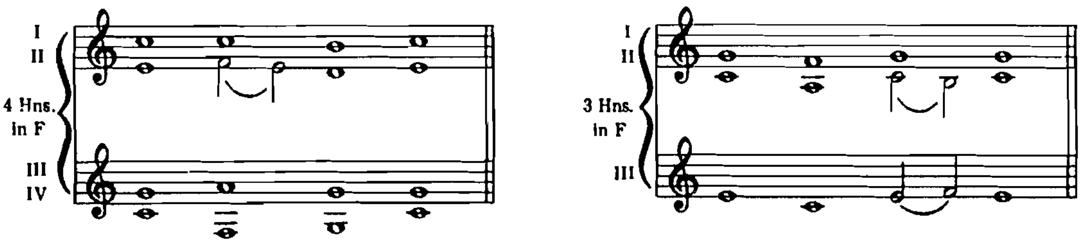
Today the four horns are usually divided in the following manner:

I and III, High Horns
II and IV, Low Horns

This arrangement probably comes from the fact that when four horns were first introduced into the orchestra, each pair was in a different key. When all four played the modern horn and the key for all was the same, the tradition remained. Even when there are three horns in the scoring, the third is placed (pitchwise) between the first and second.

The appearance in the score is almost always as follows:

Example X–6

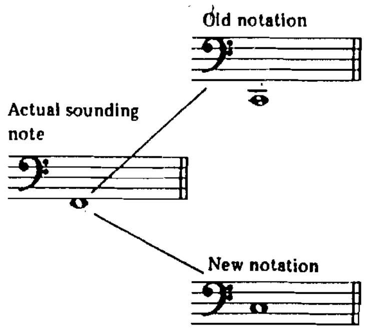


Before presenting some famous solo passages and some successful harmonic excerpts from the literature, it is important to recapitualate an earlier admonition concerning the difficulty the hornist will experience in executing wide leaps or excessively fast and jagged runs. It must be remembered that the horn player must "hear" and then "find" each note in his mind and in his embouchure.

Old and New Notation

In all new scores and new editions of older scores, the horn in F always transposes a perfect fifth down, whether the part is notated in the treble or the bass clef. In many scores of the nineteenth century, the horn notated in the bass clef transposed a perfect fourth up. Here is how it worked:

Example X–7



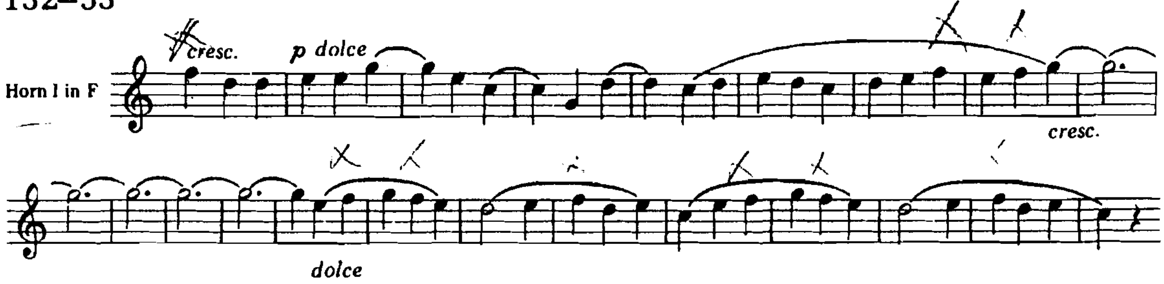
One must be aware of this discrepancy and be prepared to answer questions about one's own notation. Some authorities even feel that a note should be placed at the beginning of the score stating that all horn passages are to be transposed a perfect fifth down. This provides a warning for those horn players who have become accustomed to the old notation, which should no longer be used.

Here are some representative horn passages:

Example X–8. Brahms, *Symphony No. 1*, fourth movement, mm. 30–38



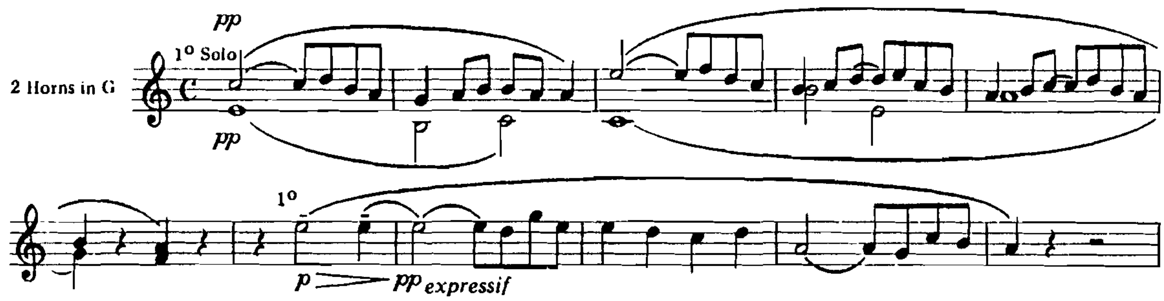
Example X–9. Beethoven, *Symphony No. 6,* third movement, mm. 132–53



Example X–10. Strauss, *Till Eulenspiegel,* mm. 6–12

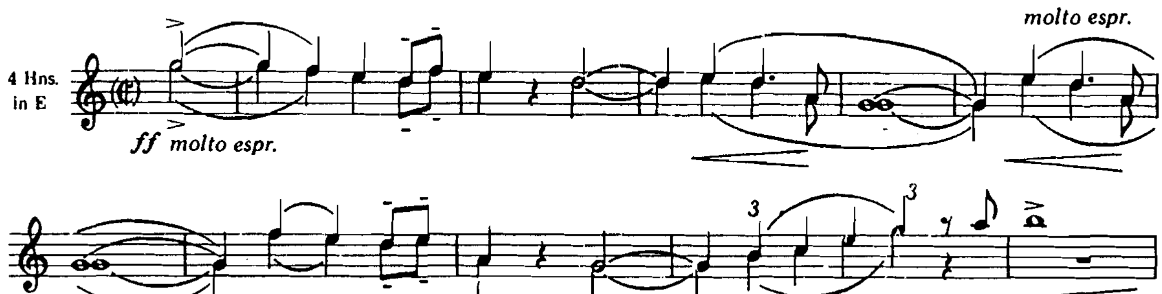


Example X–11. Ravel, *Pavane pour une infante défunte,* mm. 1–11

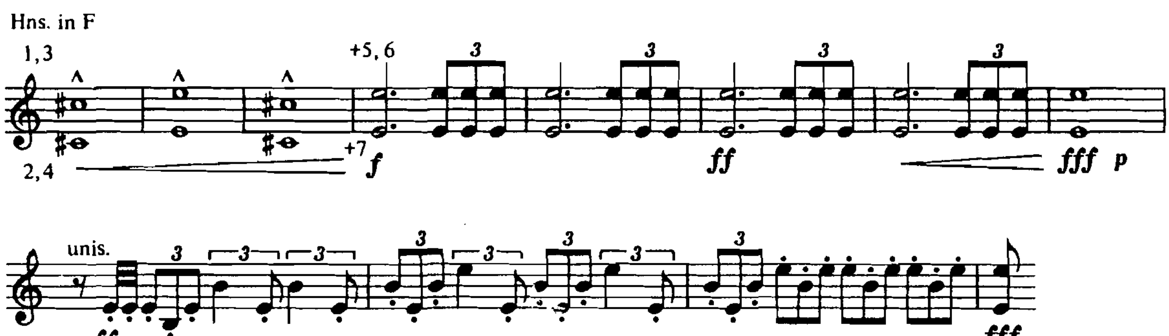


Multiple horns in unison:

Example X–12. Strauss, *Don Juan,* mm. 530–40



Example X–13. Mahler, *Symphony No. 1,* first movement, mm. 345–56



See also:

Brahms, *Symphony No. 4,* first movement, mm. 1–4
Dvořák, *Symphony No. 5,* fourth movement, mm. 132–36

Multiple horns in harmony:

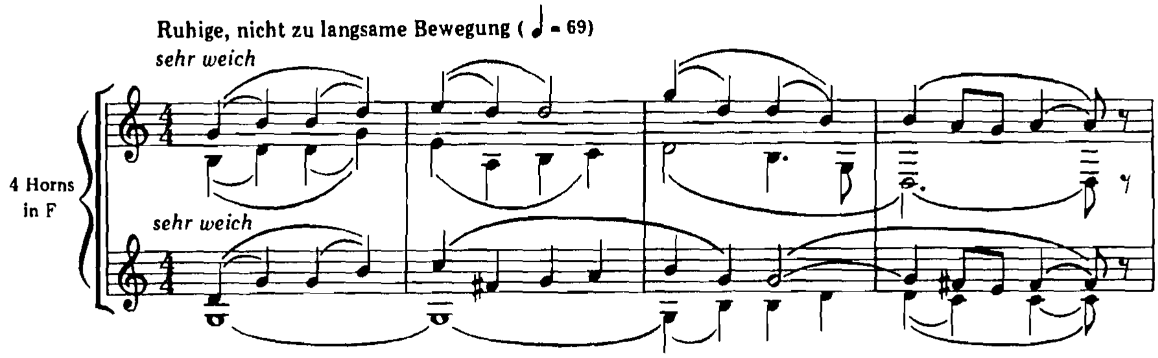
Example X–14. Handel, *Judas Maccabaeus,* "See the Conquering Hero," mm. 9–16

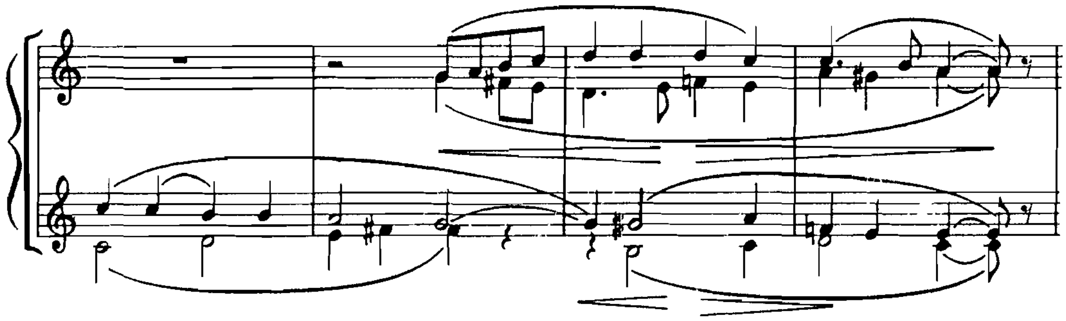


Example X–15. Weber, Overture to *Der Freischütz,* mm. 10–25



Example X–16. Humperdinck, Overture to *Hänsel und Gretel,* mm. 1–8





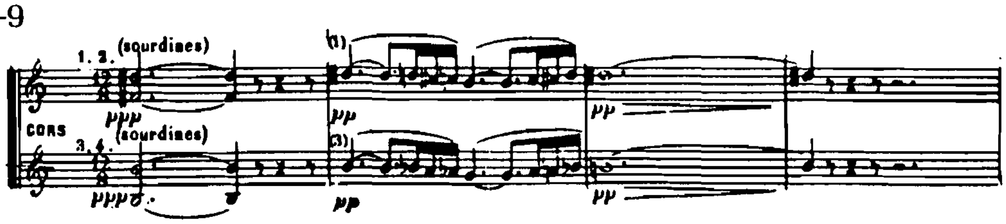
See also:

Mendelssohn, *A Midsummer Night's Dream*, Nocturne, mm. 72–80
Liszt, *Les Préludes*, mm. 69–73
Franck, *Symphony in D minor*, second movement, mm. 62–70
Wagner, *Tannhäuser*, Act I, scene 3, mm. 1–38
Mahler, *Symphony No. 1*, first movement, mm. 32–36

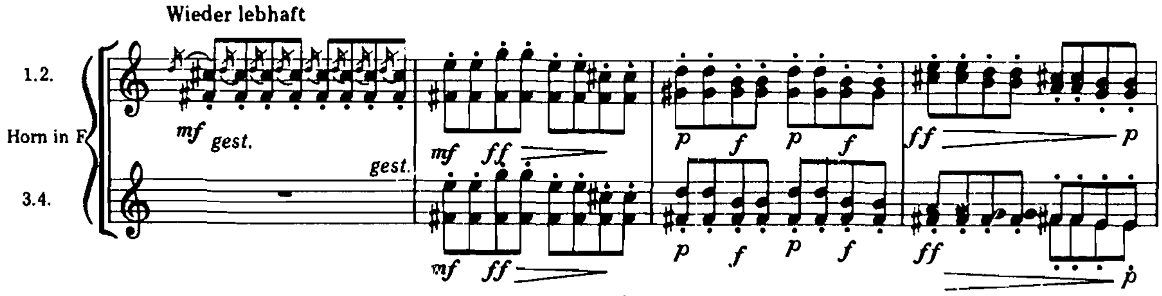
Muted and Stopped Horn, *Chiuso* (It.), *Bouché* (Fr.), *Gestopft* (Ger.)

When the words *con sordino* appear in a part, the modern horn player usually puts a non-transposing mute into the bell. This mute changes the tone color of the instrument, but does not change the pitch. The words *chiuso*, *bouché*, and *gestopft* all mean "stopped" in their respective languages, but often, when there are longer passages such as in Example X–18, the player may elect to use a mute rather than a hand, although one must keep in mind that the sound of a "stopped" horn is certainly different from a muted one. This would not be the case when a fast switch is required, as in Example X–19. Here are two famous passages for muted horns, one soft and one loud. (The nomenclature for muting is the same as for strings.)

Example X–17. Debussy, *Prélude à l'après-midi d'un faune*, mm. 106–9



Example X–18. Mahler, *Symphony No. 4*, fourth movement, mm. 76–79

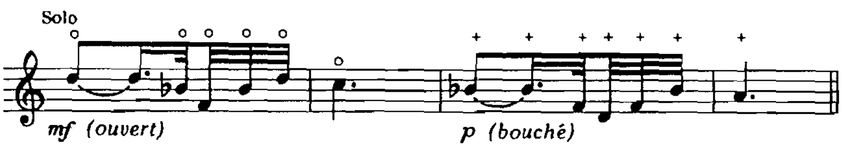


As soon as the mute is to be removed, either the term *senza sordino* or *open* must appear.

The *stopped horn* is one that is muted by inserting the right hand as far as possible into the bell to the throat, blocking much of the tone. This results in a soft but nasal and sharp sound. Stopped horn is used for single notes or soft passages. It is also effective when one wishes to have the horn play *sf>p*. The sign, as has been shown before for the stopping of a note, is a cross "+" above or below the note, with a "o" meaning open.

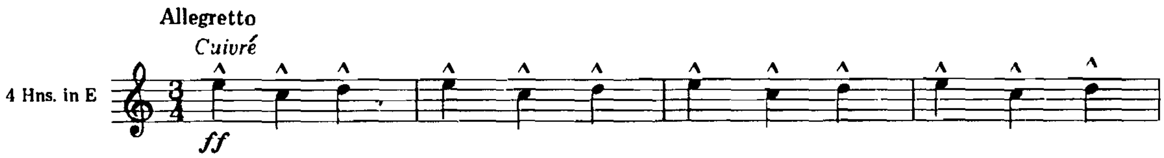
Here is an excerpt from *Capriccio espagnol* by Rimsky-Korsakov, in which he asks that the same passage be played open then stopped.

Example X–19. Rimsky-Korsakov, *Capriccio espagnol*, second movement, mm. 45–48



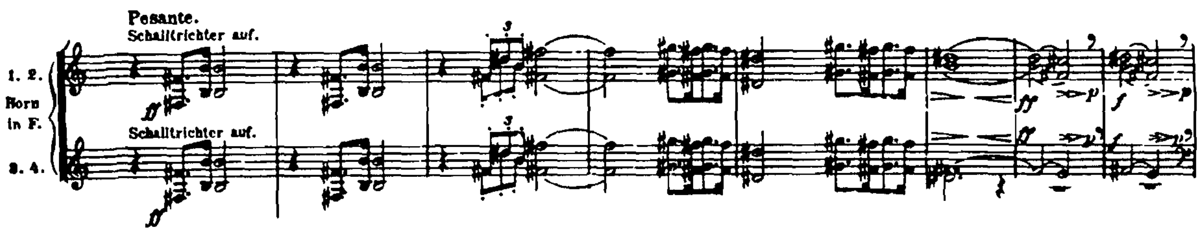
Another popular effect is called for with the French word *cuivré*, which means "brassy." It is obtained by greater-than-normal lip tension and harder blowing, causing the metal to vibrate.

Example X–20. Bizet, *L'Arlésienne Suite No. 1*, "Carillon," mm. 1–4



Some composers ask that a passage be played "Bells up" or "Bells in the air." In French this is marked *pavillons en l'air*, and in German, *Schalltrichter auf*. When this effect is asked for, the hornist turns the bell upward so the opening faces the audience. He also removes his right hand from inside and holds the bell up with it. Of course, this is for very loud and boisterous passages.

Example X–21. Mahler, *Symphony No. 4*, third movement, mm. 319–25



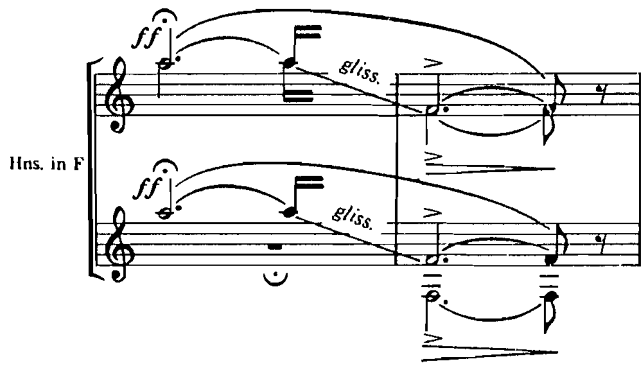
The glissando is used infrequently on the horn. As has been previously stated, it sounds best in the upper part of the range where the partials are closest together, and then only upward and in loud passages. There are a few examples of glissandi:

Example X–22. Strauss, *Der Rosenkavalier*, Introduction, m. 30



(Played as a glissando)

Example X–23. Barber, *Symphony No. 1*, mm. 135–36



See also Stravinsky, *Le Sacre du printemps*, "Danse sacrale," mm. 152–56.

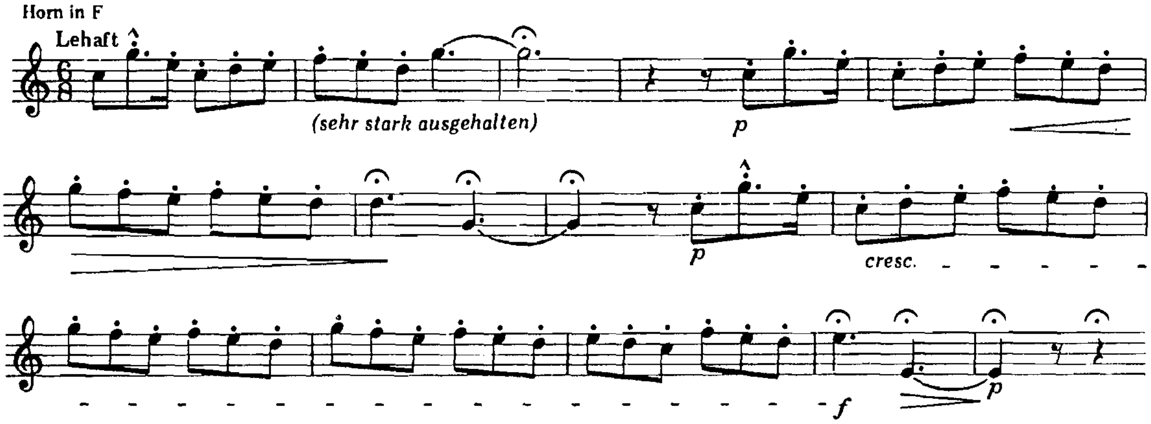
Phrasing, Tonguing, and Trills

All phrases under one slur will automatically be performed on one breath. As far as single-tonguing is concerned, we should make a distinct difference between two different kinds of articulations. We may call one regular, staccato, or hard-tonguing, and the other, soft- or legato-tonguing. The first would use the syllable *ta* as its tonguing articulation, the other, *da*. There are innumerable examples of these two kinds of single-tonguing. Here is an example of each:

Example X–24. Tchaikovsky, *Symphony No. 5*, second movement, mm. 8–16 (soft-tonguing)



Example X–25. Wagner, *Siegfried*, Act I, scene 2, mm. 1–14 (hard-tonguing)



Single-, double-, and triple-tonguing are all possible. The following passage, because of its speed, would probably be double-tongued:

Example X–26. Rimsky-Korsakov, *Capriccio espagnol*, fifth movement, mm. 119–31 (double-tonguing)



Example X–27. Strauss, *Don Juan*, mm. 501–5 (triple-tonguing)



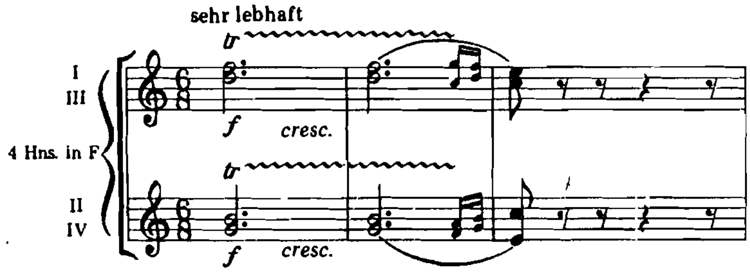
Next, a rather simple instance of triple-tonguing of repeated notes in a soft dynamic:

Example X–28. Scriabin, *Poème de l'extase*, mm. 181–83

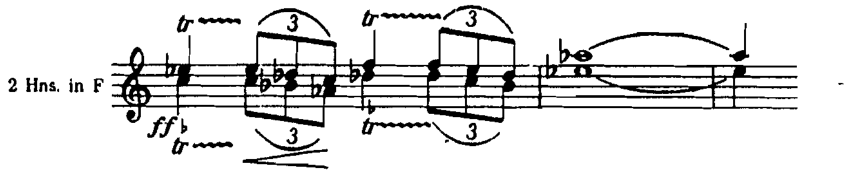


Trills on the horn are produced either with the valve or by the lips alone. They are a bit heavy and sluggish, but can have a comical or sardonic effect. The most successful are regular trills with the major or minor second above or below. Tremolos of intervals larger than seconds are also possible, but extremely difficult and risky. Here are some examples of these effects:

Example X–29. Strauss, *Till Eulenspiegel*, mm. 641–43



Example X–30. Strauss, *Salome*, [360], mm. 1–3



See also:

Mahler, *Symphony No. 9*, second movement, mm. 13–15
Chabrier, *España*, mm. 464–68
Falla, *El Amor Brujo*, "Ritual Fire Dance," mm. 249–54

General Remarks

The horn is an excellent solo instrument as well as a successful doubler. Even though it has a mellower sound than the trumpet, it does possess enough brilliance and carrying power in loud passages to be heard over almost any combination of instruments. On the other hand, because of its velvetlike tone quality, especially in the

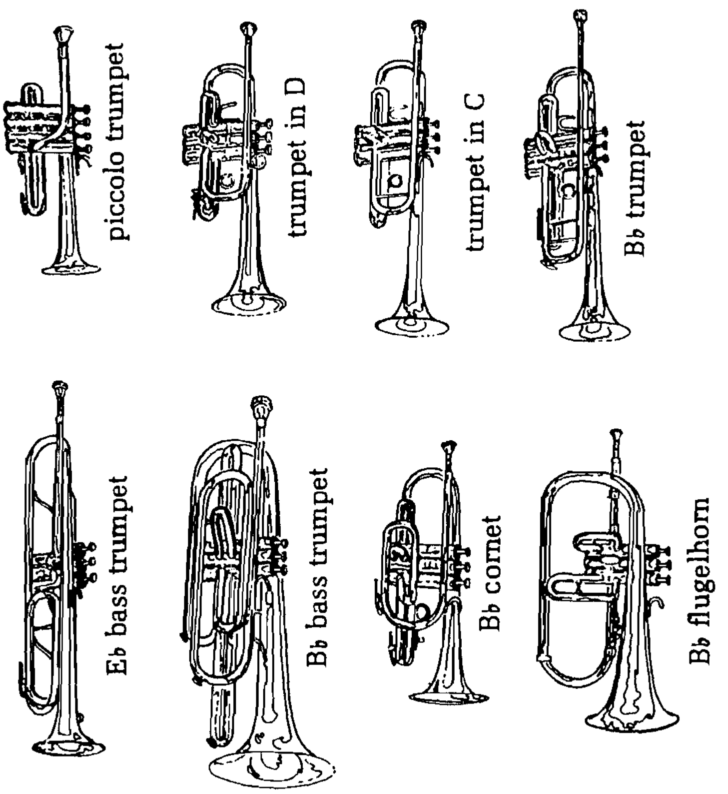
middle register, four horns make for a wonderful "accompaniment choir" for any solo instrument. It has as much agility as any brass instrument and a distinctiveness of tone color that has always made it a symbol of heroism and individuality for many composers. Before leaving the subject, we should call attention to its dichotomous nature. Many composers have treated the horn as a woodwind instrument some of the time and a member of the brass section at other times. Traditionally it has been a member of the wind quintet as well as the brass quintet in chamber music, and this gives the horn unique status in that genre as well as in the modern symphony orchestra.

TRUMPET

Tromba (It.), *Trompette* (Fr.), *Trompete* (Ger.)

At first glance, it would seem that the history of the trumpet and trumpet playing closely parallels that of the horn. Like the horn, the early trumpet was valveless, resembling the bugles we know today. Their tone was brilliant, and, of course, the pitch depended on the length of the tube. However, during the Baroque period there was an

The Trumpet family




Barbara Butler, trumpet

extraordinary outburst of trumpet virtuosity—what we have come to call the art of clarino playing. The demands made upon the trumpet rivaled those for the oboe and violin. Then, with the rise of the homophonic style in the early eighteenth century, the intricate, showy clarino playing virtually disappeared. In order to perform a diatonic melody required by the new style of the eighteenth century, the trumpet would have to be written in the highest register (the clarino register) and therefore sound extremely piercing and obtrusive. To prevent this unbalance, composers relegated the trumpet to a purely secondary role holding long tonic or dominant pedal notes, or playing in chordal passages during tutti sections. This practice continued into the nineteenth century, until the advent of the valve trumpet. Here is a typical clarino part by Bach and some later trumpet parts of Haydn, Mozart, and Beethoven:

Example X–31. Bach, *Cantata No. 51*, last movement, mm. 5–16



Example X–32. Haydn, *Symphony No. 94* ("Surprise"), fourth movement, mm. 249–68



Example X–33. Beethoven, *Symphony No. 3* ("Eroica"), first movement, mm. 37–45



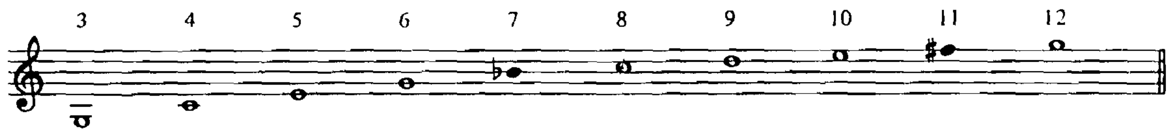
Example X–34. Mozart, *Piano Concerto* K. 503, third movement, mm. 24–32



In solo literature there are some concertos, such as those by Haydn and Hummel, in which the trumpet's potential is exploited even after the Baroque period.

The range of the natural trumpet presents problems similar to the natural horn ranges. After clarino playing disappeared, the Classical composers seldom if ever wrote higher than the twelfth partial. For all practical purposes, the first two partials of the harmonic series were unplayable on all but the F trumpet, and even there the pitch was quite uncertain. So the composer had the following limited choices:

Example X–35



The seventh partial was always very flat and had to be adjusted by the embouchure, while the eleventh partial really lies between F♮ and F♯, and a major correction was needed. Of course, no "right hand in the bell" adjustment can be accomplished on the trumpet, so all of the pitch corrections depended on the player's skill in manipulating his lips.

Transpositions

The C trumpet is nontransposing and sounds as written. There are no alto-basso designations in the crooks for the natural trumpet, but four of the most popular of these instruments transpose up while three transpose down.

	Trumpet in	*Sounds*
Transposing (sounding) up:	F	a perfect fourth up
	E	a major third up
	E♭	a minor third up
	D	a major second up
	C	sounds as written
Transposing (sounding) down:	B	a minor second down
	B♭	a major second down
	A	a minor third down

As far as we know, these were the only trumpet crooks that were in use. There are works, however, that call for trumpet in G, trumpet in A♭, and others. For these transpositions the most popular crooks were used with adjustments made by the player.

The examples of typical Classical trumpet parts on pages 270–71 illustrate the limitations placed on the instrument by requirements of orchestral balance. Some very strange voice leadings resulted when trumpet notes were unavailable in certain chords, as illustrated by this most "unclassical" leap in the second trumpet part:

Example X–36. Beethoven, *Symphony No. 6*, fifth movement, mm. 219–23



The harmony goes from F major in mm. 219–20, to D minor in mm. 221–22, and to G major in mm 223. The unidiomatic skip of a major ninth is necessary because the C trumpet could not play or double any note in the D minor chord other than the fourth-line D.

On the other hand, Beethoven uses the trumpet most effectively with characteristic gestures, such as these two thrilling passages from the *Symphony No. 5* and that stunning fanfare in the *Leonore Overture No. 3:*

Example X–37. Beethoven, *Symphony No. 5*, second movement, mm. 147–58



Example X–38. Beethoven, *Symphony No. 5*, fourth movement, mm. 1–6



Example X–39. Beethoven, *Leonore Overture No. 3*, mm. 295–300



It is interesting to note that the natural horn was used in the orchestra of the Classical and early Romantic periods much more frequently than the natural trumpet, probably due to the horn's less piercing, mellower quality even in its higher registers. Berlioz in the *Symphonie fantastique* assigns rather uninspiring parts to the two

trumpets, but gives rather interesting parts to two cornets, which had valves and were fully chromatic. Also, as shall be established later, these cornets were much mellower than trumpets because of their bore and because they are really descendants of the posthorn family, not the trumpet family.

Other natural trumpet examples:

Example X–40. Tchaikovsky, *Capriccio italien*, mm. 1–7



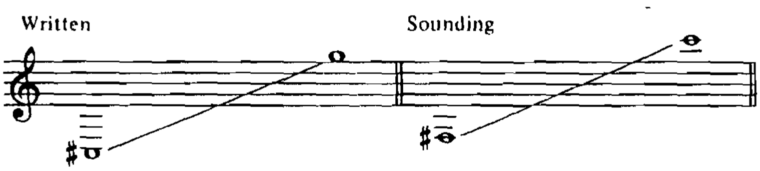
Example X–41. Mendelssohn, *A Midsummer Night's Dream*, "Wedding March," mm. 1–5



The Valve Trumpet

The earliest valve trumpets made their appearance around the middle of the nineteenth century. They were the old F trumpets, to which three valves had been added. Their playing range was from the third to the twelfth harmonic with all chromatic tones in between.

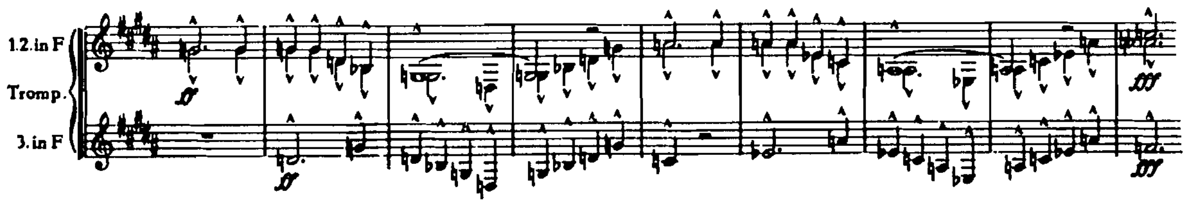
Example X–42. Range



The instrument has a very large and noble sound and a tendency to dominate the orchestra. This is both a virtue and a flaw, for the melodies written for the instrument by Mahler, Bruckner, Strauss, and others certainly sound most impressive on the F trumpet. Yet its tremendous carrying power tends to unbalance the normal brass section. Therefore, composers of the twentieth century have tended to avoid this "royal" instrument and opt for the smaller valve trumpets in C and B♭.

Here are some excerpts of passages for trumpet in F from the late nineteenth-century literature:

Example X–43. Bruckner, *Symphony No. 7*, first movement, mm. 233–41



Example X–44. Mahler, *Symphony No. 2* ("Resurrection"), first movement, mm. 192–97



Up until the middle of the nineteenth century, composers had notated trumpets in the key of the crooks. Later, most players performed these parts on the valve trumpet in F. Strauss, in his revision of Berlioz's *Treatise on Instrumentation*, suggests that the best procedure to follow in trumpet writing is to notate it in C, letting the player do the transposition on the F trumpet or any other instrument of his choice. Many composers, including Strauss himself, followed this advice. However, as the demand for a higher tessitura increased and the preference for a smaller yet more brilliant tone and greater agility prevailed, the smaller B♭ and C trumpets became the standard instruments of the modern symphony orchestra.

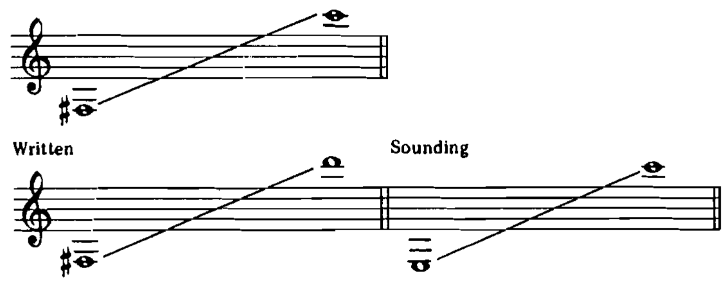
The Modern Trumpet

The modern trumpet is a flexible, most agile instrument. It is fitted with three piston valves, not rotary valves like the horn.

Example X–45. Range

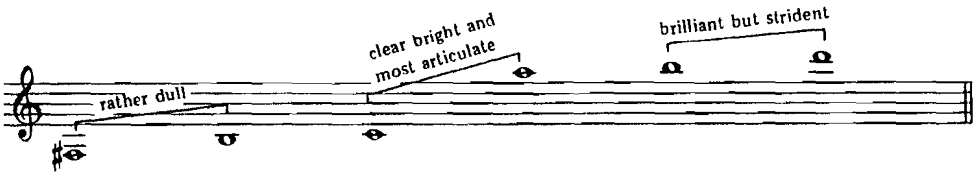
Trumpet in C*

Trumpet in B♭



* Many trumpeters are able to player higher than the range given here, but it is risky to write above the high C.

Example X–46. Register Characteristics for both C and B♭ Trumpet



The following list shows fingering and easily available pitches in the seven valve positions:

Open



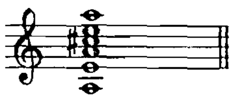
Second valve depressed



First valve depressed



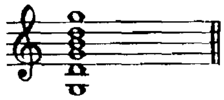
Third valve depressed or one and two



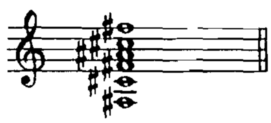
Second and third valves depressed



First and third valves depressed



All valves depressed



On the B♭ instrument these are the written pitches, but they sound a major second lower. All B♭ trumpets were equipped with a small slide to transform it to an A instrument, but it was found that the A slide was very unreliable as far as pitch accuracy was concerned, and therefore it was discontinued.

The C instrument is the smaller of the two standard trumpets of today. Some composers prefer it because it has a more brilliant and more focused sound. The B♭ trumpet is a bit "fatter" and richer and is most commonly used in bands and jazz groups, as well as in the symphony orchestra. In our time, Richard Strauss's admonition still rings true. No matter what instrument you ask for, the trumpeter will choose the one he finds most convenient for his use for a particular work. For instance, many professionals today own D trumpets and prefer to play certain high passages on that smaller instrument. On the other hand, most nonprofessional orchestra players own only B♭ trumpets and therefore have to transpose all their parts for that instrument.

Melodic Writing

The trumpet is the soprano member of the brass family and is often called upon to perform very high passages both loudly and softly.

Of course, by its very nature the loud passage is much simpler to play than a *pianissimo* in the extreme high register. In the low register a *pianissimo* is also hard to control, and extremely loud notes, though not easy, are safer than soft ones. The middle register, from middle C to B♭ above the staff, is the most manageable, and all dynamics are possible and effective for professional players. However, a caution is appropriate: the nonprofessional trumpet player will have great difficulty controlling the soft dynamics almost anywhere in the entire range.

Here is a melody encompassing the entire range of the trumpet and showing its characteristics in different situations:

Example X–47. Copland, *Outdoor Overture*, mm. 16–31



See also:

Schoenberg, *Five Pieces for Orchestra*, No. 2 (*Vergangenes*), mm. 129–31
Shostakovich, *Symphony No. 5*, last movement, mm. 2–11
Shostakovich, *Symphony No. 1*, second movement, mm. 113–16
Bartók, *Concerto for Orchestra*, fifth movement, mm. 201–11

Muted Trumpet

Unless otherwise specified, the orchestral trumpeter will use a straight mute when a mute is called for. Muted passages are effective and very common in the literature. There are no special problems such as the ones faced by the horn. The mutes do not affect transposition, but simply change the tone color of the instrument. They certainly soften the instrument also. Here are some effective muted trumpet passages from the orchestral repertoire:

First, an example of the same passage open and muted:

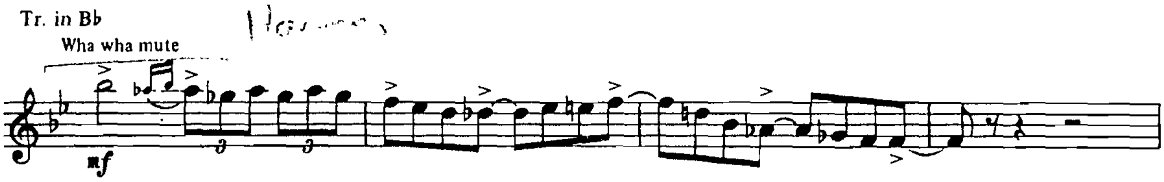
Example X–48. Mahler, *Symphony No. 1*, fourth movement, mm. 623–25, and mm. 592–94 (the same passage, one-half tone lower and *con sordino*)



Example X–49. Debussy, *Nocturnes: Fêtes*, mm. 124–30



Example X–50. Gershwin, *Rhapsody in Blue*, mm. 16–19



See also:

Bartók, *Concerto for Orchestra*, second movement, mm. 90–101
Stravinsky, *Petrushka*, second tableau, mm. 33–39

Since there is no way the hand can mute the trumpet, horn effects like stopping are quite impossible. The hand is used, however, to

produce the jazzy "wa-wa" effect with the mute called by that name, and to manipulate a plunger which softens the instrument greatly. Other trumpet mutes used primarily by dance and theater orchestras are: the Harmon mute, bucket mute, solo tone mute, cup mute, and whisper mute. Many trumpeters have invented their own mutes, so the variants are constantly changing. Sometimes one sees the direction "into the hat" or "into the stand." This simply means that the player points the instrument into a plastic "hand hat" or plays very close to the stand.

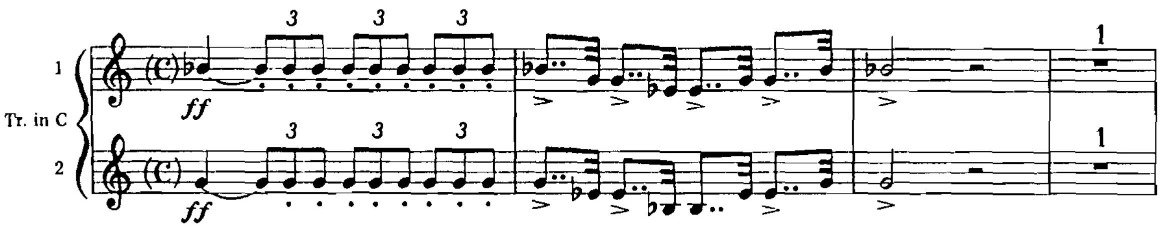
The direction for using a mute is usually *con sordino* and *senza sordino* when the mute is to be removed. The German late Romantic composers frequently used the word *gestopft* (meaning "stopped"). The word *offen*, ("open") is a signal to resume the regular sound. The English word *open* has become as popular as the Italian *senza sordino* in recent times.

Phrasing and Tonguing

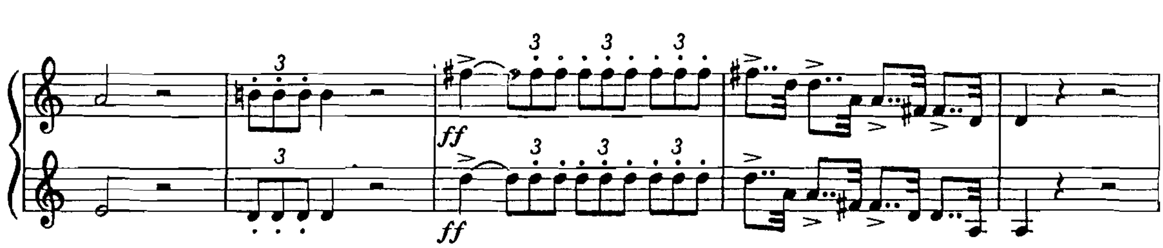
As in all wind and brass instruments, all slurred notes are performed on one breath, while all separate notes are tongued. The trumpet is no exception to this rule. It has been stated that the trumpet is the most agile of the brass instruments, and now one can add that it is the fastest speaking in the choir. All kinds of fast passages, both tongued and slurred, are possible and most effective; single-, double-, as well as triple-tonguing is in constant use on the trumpet.

Here are some passages to illustrate phrasing and various types of tonguing on the trumpet:

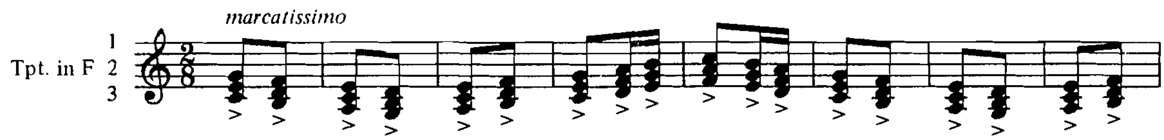
Example X–51. Verdi, *Aïda*, Act I, "Celesta Aïda," mm. 1–13 (triple-tonguing)







Example X–52. Puccini, *La Bohème*, Act II, opening (double-tonguing)



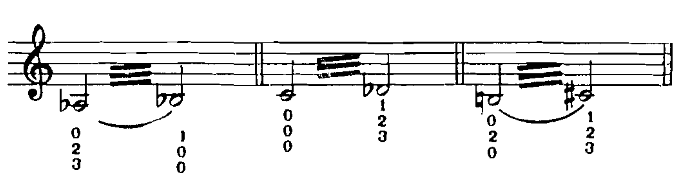
See also:

Rossini, Overture, to *William Tell*, mm. 226–41
Ravel, *Daphnis et Chloé Suite No. 2*, 203 , mm. 10–15
Shostakovich, *Symphony No. 1*, first movement, mm. 1–8
Bruckner, *Symphony No. 7*, third movement, mm. 77–88
Dukas, *L'Apprenti sorcier*, mm. 606–15
Rimsky-Korsakov, *Capriccio espagnol* third movement, mm. 37–41
Strauss, *Till Eulenspiegel*, mm. 544–64
Wagner, *Tannhäuser*, Act II, scenes 3 and 4, mm. 72–75, mm. 204–10

Trills

Trills on the trumpet are executed by means of the pistons, although some lip trills are possible in the high register. Some trills are awkward because they involve more than one piston. Those should be avoided if possible:

Example X–53.



Glissandi

The trumpet is sometimes asked to glissando. This is effective only in an upward direction and for the most part in the uppermost portion of the range, where the partials are close together. The player is also able to "bend" a pitch downward by a quarter or a half step. The latter is a new effect required only by later twentieth-century composers.

Example X–54



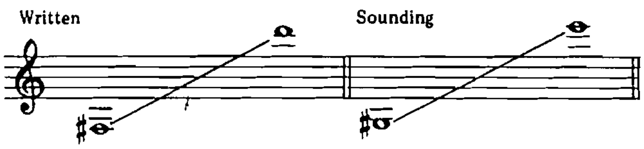
Auxiliary Trumpets

During this discussion, it has been mentioned that the trumpet in D is returning to frequent use. It is a brilliant, small instrument with a very piercing, bright tone. The technique and range are the same as the C and B♭ trumpets, but the low register (below middle C) is not very manageable. However, one should keep in mind that the D trumpet and its less-known sister, the E♭ trumpet, are usually used in the higher register.

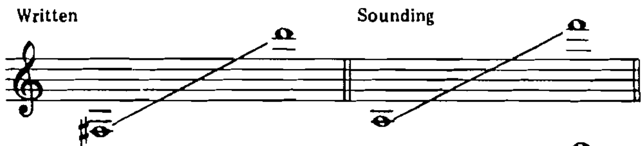
Today, the D and E♭ piccolo trumpets are used to perform the clarino parts in the music of the Baroque masters. They are often joined by the B♭ piccolo trumpet, which transposes a minor seventh up and has an effective range from the B♭ below middle C to the A above the staff.

Example X–55. Range

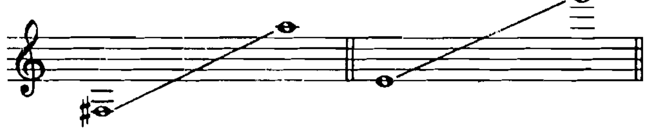
Trumpet in D



Trumpet in E♭



Piccolo trumpet in B♭



Here are some passages for these trumpets:

Example X–56. Stravinsky, *Le Sacre du printemps*, "Jeux des cités rivales," mm. 38–42



Example X–57. Britten, *Four Sea Interludes*, second movement, mm. 85–89



Example X–58. D'Indy, *Symphony in B-flat*, fourth movement, mm. 336–43



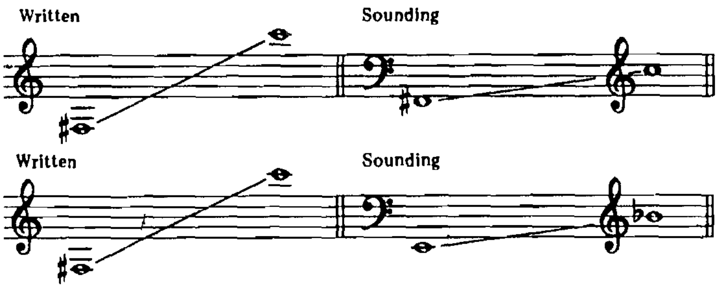
BASS TRUMPET

The bass trumpet is really a trombone with valves. It usually is played by trombone players using a trombone mouthpiece and is written in C, B♭, D, or E♭. The C and B♭ instruments sound an octave or a major ninth lower than written:

Example X–59

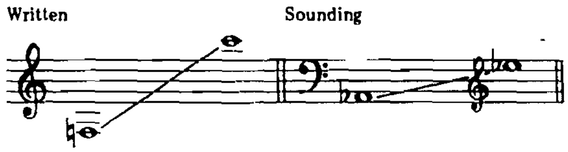
Bass trumpet in C

Bass trumpet in B♭



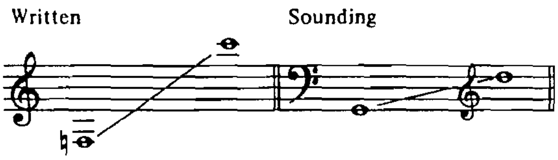
The bass trumpet in E♭ sounds a major sixth lower than written:

Example X–60



The bass trumpet in D will sound a minor seventh lower than written:

Example X–61



Here are some examples of the use of the bass trumpet:

Example X–62. Wagner, *Die Walküre*, Act III, mm. 12–18



Example X–63. Wagner, *Die Walküre*, Act III, Wotan's aria "Denn Einer nur freie die Braut," mm. 1–4



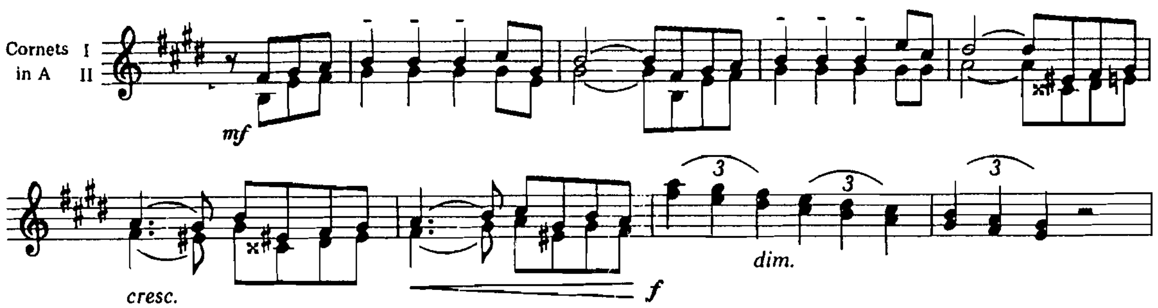
CORNET

Even though many composers since Berlioz have used the cornet, it has never become a regular member of the symphony orchestra. The instrument looks like a modern trumpet and has been standardized in B♭ (with the same range as the B♭ trumpet), but the tone and construction of the instrument make it a cross between a horn and a trumpet. It has a bore which is two-thirds conical and one-third cylindrical and is played with a cup mouthpiece. The tone is much more mellow than a trumpet, but less brilliant and heroic. It is ideal for folk music and military functions and is used a great deal in nineteenth- and early twentieth-century scores to announce long tunes. The instrument is very secure in pitch and has as much agility as the trumpet, and before the valve trumpet was accepted by composers, they wrote for cornets, which had valves from their inception.

The cornet is a regular member of the band and of many theater orchestras, especially in Europe. The trumpet, with its greater brilliance of tone and its ability to match the cornet in versatility, has for all practical purposes completely replaced the cornet in the orchestra.

Nevertheless, there are some wonderful cornet passages in the orchestral literature:

Example X–64. Tchaikovsky, *Capriccio italien*, mm. 232–40



Example X–65. Stravinsky, *Petrushka*, Ballerina's Dance, mm. 1–28



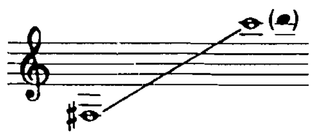
See also:

Berlioz, *Symphonie fantastique,* fourth movement, mm. 62–69
Prokofiev, *Lieutenant Kijé,* mm. 1–5

FLUGELHORN

The Flugelhorn sounds a major second lower than written:

Example X–66. Range



The Flugelhorn is a member of the bugle and cornet family. It is infrequently used in the symphony orchestra, but often in bands, wind ensembles, and jazz groups. The name comes from *Flügelmann* (wing man), the designation of the person who played the instrument and who marched in the front right-hand corner of the German military-band formation. The first Flugelhorns, manufactured in Austria between 1820 and 1830, retain the wide conical bore and the medium-sized bell of their antecedent, the keyed bugle. With the passing of time, however, manufacturers have narrowed the bore so that now the only difference between a cornet and a Flugelhorn is the latter's larger bell.

The most commonly used Flugelhorn today is in B♭ and shares the compass as well as the notation of the cornet. In former years there were Flugelhorns pitched in E♭, F, and C, but these are all outmoded today. The modern instrument has three valves and is played with a

funnel-shaped mouthpiece which differs from that of the cornet by its greater width and depth. It has a very mellow and lush sound, perhaps closer to that of the horn than the cornet. As a matter of fact, there is evidence that in the early years of this century the Flugelhorn was at times substituted for the high horn performing the solo in the "Quoniam" from Bach's *B-minor Mass.*

Although the Flugelhorn is not often found in the symphony orchestra, there is a famous place in Stravinsky's *Threni* where the instrument is called for.

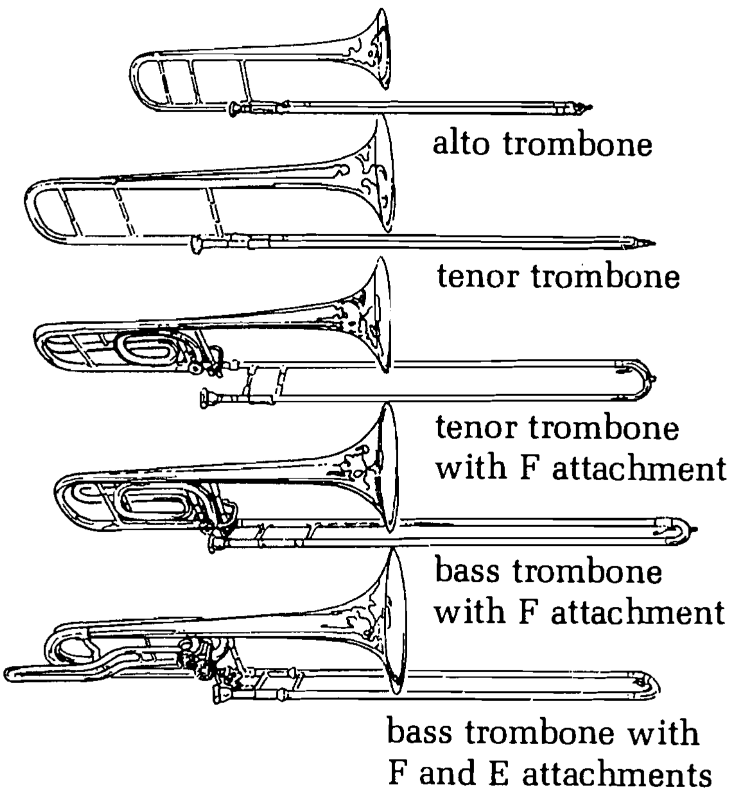
Example X–67. Stravinsky, *Threni*, mm. 89–99



TROMBONE

Posaune (Ger.)

The Trombone family





John Marcellus, trombone

Although three kinds of trombones are still in general use today—the alto, tenor, and bass trombone—there are no great problems of instrument use and transposition to frustrate the composer or orchestrator. It is worth noting, however, that the British brass band, which is very much alive in our time, uses all kinds of transpositions for the trombone and for the tuba which are rarely found in our modern symphony orchestras. The trombone, as its name implies, is a big trumpet, and first appeared, very much as it is today, way back in the fifteenth century. The unwieldly length of tubing of a bass trumpet necessitated either winding it into coils or cutting some out. The tube was therefore cut into two U-shaped pieces, one of which slides into the other. This mechanism permits the player to change pitches by altering (lengthening or shortening) the length of the tube at will and with a great deal of precision. The reason that three trombones are used in the orchestra is one of compass (range) rather than transposition or construction.

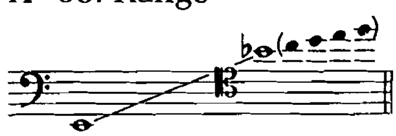
The tube of the trombone is cylindrical for about two thirds of its length and becomes conical toward the bell, which is smaller in alto and tenor trombones and flares much larger in the bass trombone, to facilitate the playing of the lower partials.

Trombones have always been nontransposing instruments. The tenor and bass trombones are notated in the bass clef up to the G above middle C; then, to save ledger lines, the tenor clef is used. The alto trombone parts have traditionally been notated in the alto clef.

TENOR TROMBONE

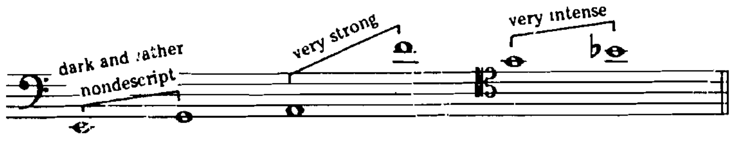
Of the three versions of trombone, the tenor is the one most commonly used in the modern symphony orchestra. There are usually two tenor trombones in each orchestra, and, until recently, they have performed the music originally written for alto trombone as well as for the tenor. However, the alto trombone is making a comeback and is now being used in some of the nineteenth-century scores which called for it specifically. It is discussed below.

Example X–68. Range



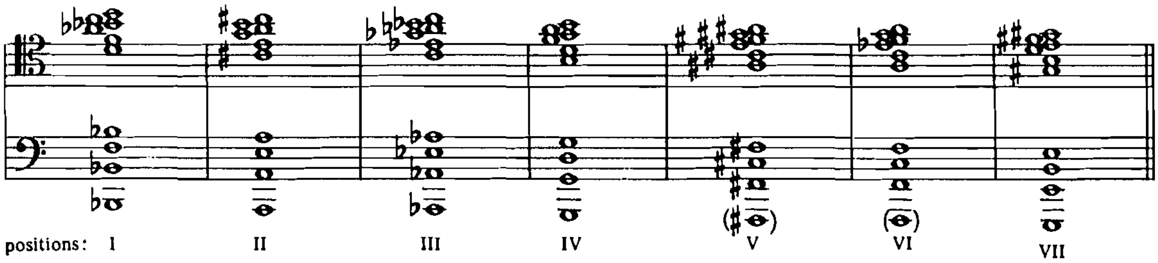
Theoretically, the quarter notes in Example X–68 are possible, and many professional players can play them, but they are difficult and risky.

Example X–69. Register Characteristics



It is important to know the different positions of the slide of the tenor trombone, for each position lowers the pitch one half step from B♭ first position all the way down to E♮, the seventh and farthest position of the slide. In seventh position the slide is all the way out.

Example X–70



The fundamentals of each position are called the *pedal notes*. They are seldom called for in symphonic orchestral music, but do occur in solo trombone literature. Only the fundamentals of the first three positions are good; the others are possible, but difficult to control. In other words, the series for practical purposes begins with the second partial, from which point on, all tones are easily produced.

There are alternate positions available for many pitches; for instance, the D above middle C can be played in the fourth and seventh position, etc., but a few of the lower notes are available in only one position. Therefore, the following passage would be rather difficult at a fast tempo:

Example X–71



It continually alternates between the two extreme positions. It is not impossible but certainly difficult, especially for nonprofessionals.

Tuning adjustments can be made by moving the upper slide on the main body of the instrument.

BASS TROMBONE

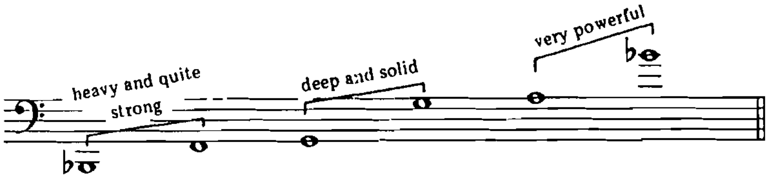
The bass trombone is usually the third of the three trombones employed in our standard symphony orchestra. The difference between the tenor and bass trombones is structural, which accounts for the difference in the quality of their sound. The latter has a larger bore and, correspondingly, a larger bell. Both tenor and bass are pitched similarly (in B♭). The tenor trombone usually has an F trigger (see below); the bass trombone always has this attachment, giving them both the ability to extend their range. The practical limits for both instruments are given in Example X–68 and X–72 respectively, but it is worth noting that both are capable of playing pedal tones to low E  and of going to low C  with the F trigger.

Example X–72. Range



The reason the B♮ is in parentheses is that it cannot be played on the regular bass trombone unless the instrument has an E slide or E trigger. Most new bass trombones have this attachment and can therefore play the note. In this connection it is important to point out that the rotary valve, which activates the extra tubing, is easily manipulated by the left thumb. This mechanism is called the *F trigger or attachment*, since it makes an F instrument out of a B♭ one. In other words, it is a double instrument like the double horn, and with the E trigger can even be thought of as a triple instrument.* Many tenor trombones are double instruments and have the extra tubing as well as the F trigger, but the real bass trombones have a wider bell and bore and use a larger mouthpiece. The very newest instruments have a D attachment, which facilitates playing in certain keys even more. These attachments also make certain glissandi possible which were very problematical before the E and D attachments were invented.

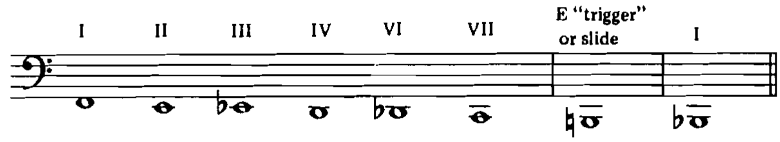
Example X–73. Register Characteristics



* Some players pull out the F trigger tuning slide to turn it into an E trigger if the E attachment is not already provided on the instrument.

The six positions of the bass trombone with F trigger are:

Example X–74



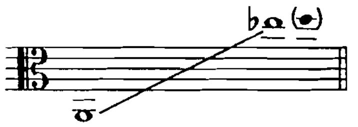
Each note given here is the second partial of the series and has an entire harmonic series up to the tenth or twelfth partial above it, as well as the fundament below it. The first four pedal notes are usable; after that, they are available to very few players.

ALTO TROMBONE

The alto trombone was used extensively throughout the nineteenth century, especially by German and Italian composers. It was also a solo instrument during the eighteenth century. Toward the end of the nineteenth century, most composers settled on two tenors and one bass, and the alto fell into disuse. However, many first trombonists today are once again using this instrument to play especially high tessitura parts and to perform the parts originally written for it.

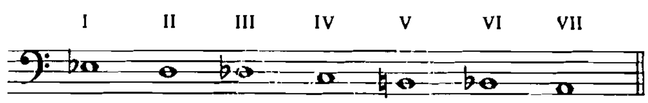
The alto is pitched in E♭, and its first position is a perfect fourth above that of the tenor. It is always notated in the alto clef.

Example X–75. Range



The instrument has a narrower bore than its two cousins, and therefore the notes from  downward are weak and of poor quality. However, the high notes are pure, mellow, yet brilliant, although not as piercing as those of the tenor trombone. Here are the seven positions, with the first playable note again being the second partial of the series. The fundamental or pedal notes are not very feasible on this instrument, and of course the regular harmonic series to the tenth or twelfth partial is possible above the fundamental.

Example X–76



Phrasing, Tonguing

All tonguings, single, double, as well as triple, are possible and effective on all three trombones. One thing must be kept in mind: because the mouthpiece is large, fast tongue strokes are a little more difficult than on the trumpet. However, today we have such excellent performers that this is much less of a problem. The size of the instrument makes the articulation of the extreme low register a bit sluggish and a bit heavy.

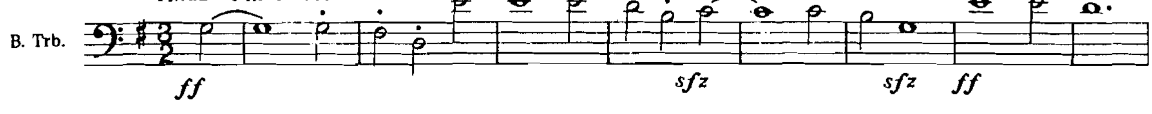
A perfect legato can only be attained between two notes in the same harmonic series, but trombonists have perfected the coordination of soft-tonguing with change of position to give an almost perfect impression of legato playing. Even though Mozart did not orchestrate the *Requiem*, we know that he liked the sound of the trombone, and his pupil Süssmayr assigned the beautiful legato solo in the "Tuba mirum" to a trombone.

Example X–77. Mozart, *Requiem*, "Tuba mirum," mm. 1–18



Here are some other characteristic examples of the orchestral uses of one, two, three, or more trombones, using various articulations:

Example X–78. Beethoven, *Symphony No. 9*, fourth movement, "Seid umschlungen," mm. 1–9 (1 trombone)



Example X–79. Berlioz, *Hungarian March*, mm. 96–105 (3 trombones)



Example X–80. Brahms, *Symphony No. 1*, fourth movement, mm. 47–51 (3 trombones)



See also:

Bach, *Cantata No. 118*, "O Jesu Christ, meins Leben Licht," mm. 1–8 (3 trombones)
Schumann, *Symphony No. 3*, fourth movement, mm. 1–8 (3 trombones)
Strauss, *Till Eulenspiegel*, mm. 546–53 (3 trombones)
Wagner, Overture to *Tannhäuser*, mm. 37–53 (3 trombones)

Glissando

The one effect still to be mentioned in this connection is the glissando. For the trombone the glissando is a "natural," for like a string player's glissando with one finger on one string, the trombone player quickly moves the slide between two notes. No purely slide glissando can be larger than a tritone, for that exhausts the positions.

Besides the slide glissando, there are two other types: the lip glissando and a combination slide and lip glissando. Thus, many glissandi which look improbable may be produced by one of these means.

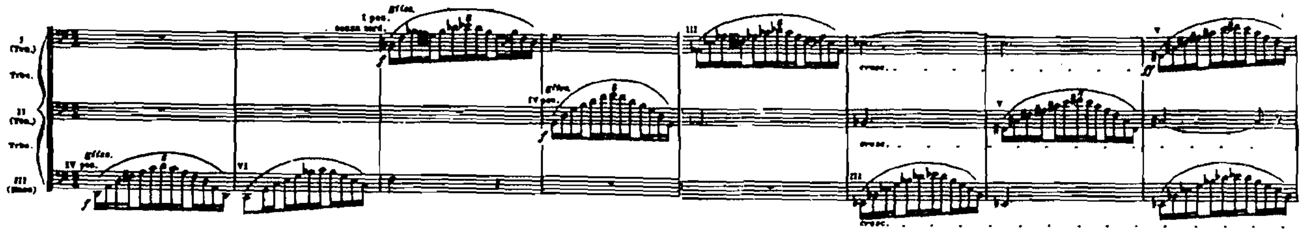
The following glissando, first for the bass trombone, then for the tenor, is perfect, since it extends from seventh to first position.

Example X–81. Bartók, *Concerto for Orchestra*, fourth movement, mm. 90–91



The effect is humorous and bizarre and should be used sparingly in orchestral music, for it has become a cliché by now. However, there is another kind of glissando which is similar to that executed by the horn over the overtone series. It has not been used too often and is quite effective.

Example X–82. Bartók, *Violin Concerto*, third movement, mm. 593–600



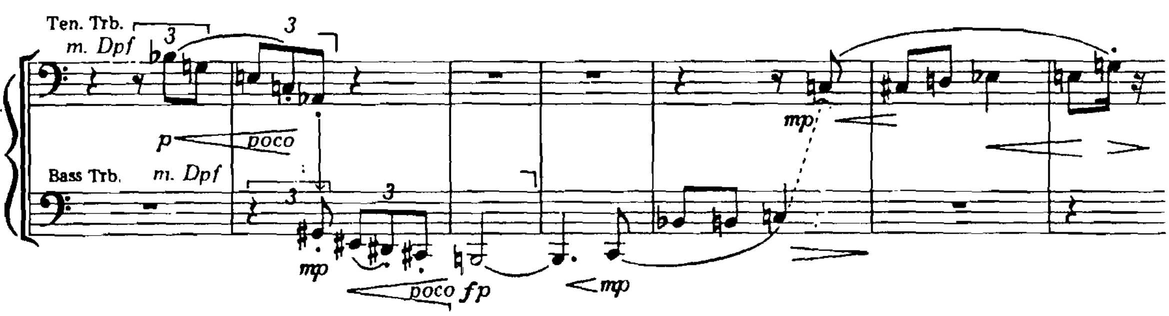
Mutes

There are several different kinds of mutes for the trombone (see pp. 277–80). Here are two examples from twentieth-century literature in which the muted trombone color is used. As with the horn and trumpet, the trombone mute changes the tone color of the instrument besides enabling the player to play very softly. The Sessions example is rather straightforward, but it is interesting to note that in the Berg *Violin Concerto* the trombones are doubled by cellos and basses playing the same notes *col legno*.

Example X–83. Sessions, *Symphony No. 2*, fourth movement, mm. 68–70



Example X–84. Berg, *Violin Concerto*, first movement, mm. 45–51



CONTRABASS TROMBONE

Wagner, Strauss, and Schoenberg are among the few composers who have called for the contrabass trombone pitched in B♭, an octave below the tenor trombone. Verdi, especially in *Falstaff*, also calls for such an instrument; however, in Italy it was a valved instrument, and, as with the "contra" parts by the German composers mentioned above, these are now played by the tuba. The contrabass trombone is much too taxing on the performer, and one is advised not to write for it anymore.

VALVE TROMBONE

This is an instrument that was built to apply the valve system rather than the slide system to the trombone. It made very little impact on the orchestra, but it did have some success in bands. It is actually a large trumpet, but the valve system presents severe intonation difficulties, and what a valve instrument might offer in facility and agility it loses in character. Today's composer is urged not to write for this instrument, since very few orchestral musicians own one.

General Remarks

The trombone as an orchestral instrument is extremely versatile. It can be used for solos, as well as to provide a warm harmonic background. As has been illustrated by the examples, it also works well as a contrapuntal partner both with other instruments and with other trombones. In subsequent chapters, we shall discuss its multiple uses as a doubler where its mellow tone and large dynamic range are exceptionally useful. All tonguings and articulations work well, and skips, no matter how wide, may be difficult, but are playable and most effective.

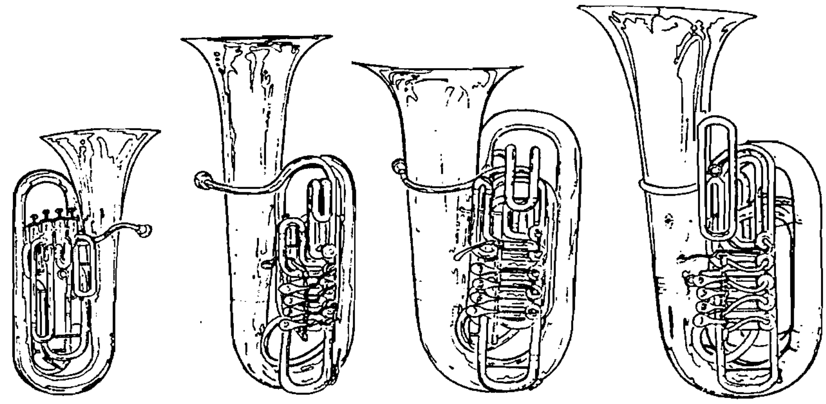
TUBA

The tuba as we know it today was not introduced into the symphony orchestra until around 1875. It was Richard Wagner who conceived of and wrote for an instrument which would have the sound characteristics of a horn yet be able to provide bass support for the trumpets and trombones. This instrument was to replace the ophicleide and a smaller tubalike instrument that had been used since the beginning of the nineteenth century. Wagner never did anything



Cherry Beauregard, tuba

The Tuba family



Euphonium · F tuba CC tuba BB♭ tuba

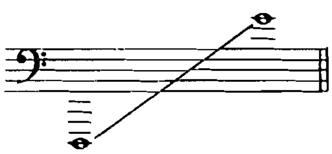
in a small way; instead of scoring for one bass tuba, he wrote for a whole family of them in *The Ring:* to call them tubas is really a misnomer, since they are extensions of the horn family and almost always played by horn players. The tenor tubas were in B♭ and E♭, while the bass tubas were in F and double B♭ (an octave below the tenor in B♭). Not many composers other than Wagner, his contemporary Bruckner, and his disciple Richard Strauss adopted the family of tubas. Gradually, the bass tuba became a standard instrument in the modern symphony orchestra.

The modern performer may choose from five or six tubas which range from the B♭ tenor tuba through the F, E♭, C, to the double B♭ tuba. The ones in C and double B♭ are the favorites of most symphonic tuba players today because they are comfortable with the fingering and are able to produce all the required pitches of the symphonic tuba repertoire.

All tubas are nontransposing, and the key or pitch designations only refer to the range, the fundamentals, and pedal notes. The instruments employ either piston or, more commonly, rotary valve systems and are constructed with a wide conical bore and a very wide bell. The player plays into a very deep cup mouthpiece, which facilitates sounding the low notes as well as the pedal tones.

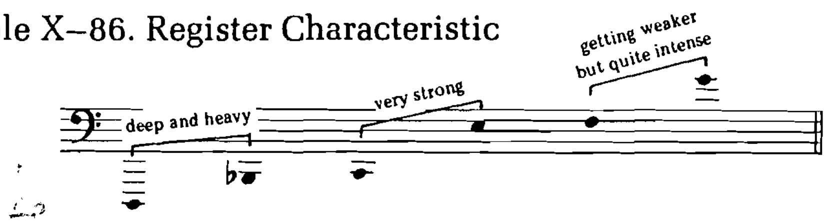
The valve system is of the usual design with an added fourth valve which lowers the fundamantal a perfect fourth. There are tubas which have a fifth and even a sixth valve; however, these are rare. The tuba is always notated in the bass clef.

Example X–85. Range



It is important to reiterate that any tubist in any modern symphony orchestra will be able to perform within this rather large range. Many tubists own more than one instrument and will change to the instrument appropriate for the particular music they are called upon to play.

Example X–86. Register Characteristic



The tuba is the true bass of the brass choir and shares some of the characteristics of the double bass and contrabassoon. It gets much thinner and loses some of its characteristic quality as it goes toward its extreme upper register. The very low register is said to be weaker than the strong middle, but it has been this author's experience that if the low notes are used as slow-moving bass notes, they can be very well controlled, and they will be effective at any dynamic from *ff* to *pp*. Because of its size, the instrument speaks a bit sluggishly at the bottom of its range, but is refreshingly agile from its middle register to the uppermost notes.

It takes a great deal of breath to play this largest of all brass instruments, and special care must be exercised not to tire out the performer. Frequent rests are strongly recommended between passages.

The tone quality is very smooth and round, and because of the conical bore and the deep mouthpiece, it is not very piercing, and resembles that of the horn. The tuba blends well with the three trombones and provides an excellent bass for them. Further, it mixes beautifully with the trumpets and, of course, the horns. The power of its attack can best be understood by considering the following type of passage:

Example X–87



The next excerpt, from the beginning of Wagner's *Faust Overture*, exemplifies the opposite facet of the instrument's character. Here we see it capable of a smooth, lyrical, soft sound:

Example X–88. Wagner, *Faust Overture*, mm. 1–3



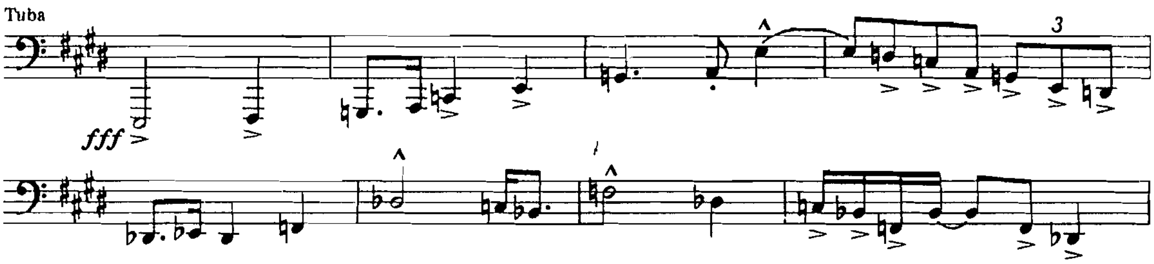
Naturally, it is more difficult to play softly in the higher register, but the next examples, though not extremely high, will show how well the tuba sounds in its middle to upper register.

Example X–89. Mahler, *Symphony No. 1*, third movement, mm. 15–23



We have already spoken of the tuba's surprising agility considering its size. Here are some samples of fast passages as well as one that asks for wide skips, which are as feasible on the tuba as on any other bass instrument.

Example X–90. Respighi, *I Fontane di Roma*, "La fontana di Trevi," mm. 28–35



Example X–91. Ravel, *La Valse*, mm. 3–14 after 68



See also:

Strauss, *Till Eulenspiegel*, mm. 553–58
Shostakovich, *Symphony No. 7*, second movement, mm. 198–216

Now to one of the most famous solo tuba passages in all of the symphonic literature, which features the upper range of the tuba so very effectively.

Example X–92. Mussorgsky-Ravel, *Pictures at an Exhibition,* "Bydlo," mm. 1–10



Trills have thus far seldom been used in symphonic literature for the tuba; they are, however, very effective and can be manipulated by the valves.

Example X–93. Wagner, Prelude to *Die Meistersinger*, mm. 158–65



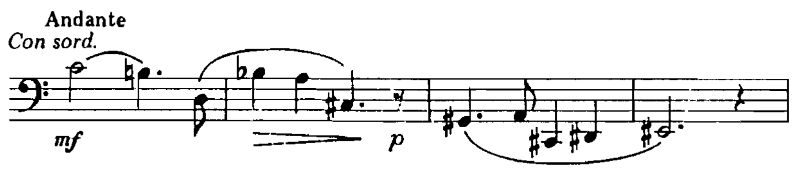
As has already been shown in the examples above phrasing and tonguing are similar on the tuba to every other brass instrument. Slurring is obviously done on one breath, while single-, double-, and triple-tonguing are all possible. Not much use has been found for double- and triple-tonguing as yet in the standard orchestral literature. Fluttertonguing is also available, and this unusual example shows a muted tuba executing very soft fluttertonguing:

Example X–94. Schoenberg, *Erwartung*, m. 426



A single type of mute is available. It is a bit awkward to put into the bell and to remove. Time must be allowed for the player to accomplish this Herculean feat. Here is a passage for muted tuba:

Example X–95



The tuba is a great doubler and can help reinforce the bass part both at a loud and soft dynamic. We have already seen many loud passages. Here is a soft one in which the tuba approximates a double-bass pizzicato:

Example X–96. Mahler, *Symphony No. 8*, first movement, mm. 250–52

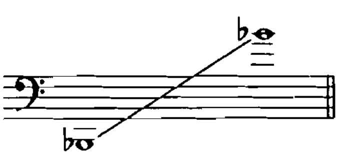


In this century the tuba has been used in many capacities and has proven to be successful as a solo orchestral voice as well as in combination with other instruments. Many composers have written scores involving two tubas (Stravinsky, Schoenberg, Harris, etc.), usually to strengthen the bass of an oversized horn and trumpet section. Another reason for using two tubas in some of these scores is not to overtax the single tubist; therefore, one plays the high tessitura while the second covers the lower register. In bands, the Sousaphone with a strangely rearranged bell is popular, but since it is never used in a normal symphony orchestra, it will not be discussed here except to say that it is able to play all parts originally written for tuba.

EUPHONIUM OR TENOR TUBA

The euphonium has replaced Wagner's tenor tuba, and the parts originally written for the Wagner tubas are usually played on the euphonium, at least in America. In contrast to the Wagner tenor tuba, which was a transposing instrument, the euphonium is nontransposing and notated in the bass clef. When reading Wagner tubas in the treble clef, the player must transpose, because the pitches sound a major ninth below the written notes.

Example X–97. Range



As can be seen, the euphonium has the same range as the bass trombone, but is constructed like a miniature tuba with a conical bore and a flared bell. It has four valves. The euphonium has a very mellow and smooth sound, and none of the pitch problems which for some reason always plagued the Wagner tubas. As yet, the

euphonium is only used as a replacement for the tenor tuba, and very few orchestral composers have written specifically for it. On the other hand, it appears extensively in the band and wind ensemble literature, where it is used with or as a substitute for the baritone.

Here is a passage which, in this country at least, is performed mostly on the euphonium.

Example X–98. Strauss, *Don Quixote*, mm. 140–42

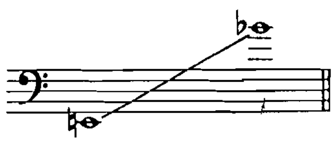


BARITONE

The baritone is strictly a band instrument; however, since it is so closely related to the euphonuim and sometimes substitutes for it, a general description is included here.

It has the range of the tenor trombone and manipulates its pitches with three valves.

Example X–99. Range



The baritone is very facile and blends well with all other instruments in the band. Some examples will be given in the chapter related to band scoring.

OPHICLEIDE

The tuba has completely replaced this instrument, which performed the bass brass parts throughout the nineteenth century. Mendelssohn, Schumann, Meyerbeer, Verdi, and many other composers used it. One of its last appearances was in Wagner's *Rienzi*. Besides the tuba, the bassoon or contrabassoon may at times be assigned the ophicleide parts.

As a matter of fact, this obsolete instrument resembled a metal bassoon, except that it had a conical tube which flared widely into a bell with a diameter of about eight inches across. The tube was pierced with large holes, covered by padded discs operated by keys similar to the bassoon. The mouthpiece was a bit more cupped than the horn's, and is said to have sounded quite mellow, similar to the modern euphonium. It was nontransposing and notated in the bass clef, so that its parts could easily be played by tuba or bassoon.

Additional suggested listening:

Trumpet:
Rimsky-Korsakov, *Le Coq d'or*, opening
Debussy, *La Mer*, from m. 44 (muted trumpet)
R. Strauss, *Also Sprach Zarathustra*, opening
Scriabin, *The Poem of Ecstasy*, p. 22, principal theme
Franck, *Symphony in D Minor*, first movement theme with English horn
Piston, *Symphony No. 2*, first movement, second theme
Hovhaness, *Saint Vertan Symphony*, second movement, "Tapor" (3 trumpets and percussion)

Horn:
Brahms, *Piano Concerto No. 2*, beginning
Brahms *Symphony No. 2*, beginning (2 horns)
Wagner, *Der fliegende Holländer*, Overture, mm. 2–15
R. Strauss, *Sinfonia domestica*, p. 111 of score (extremely high register)
Mahler, *Symphony No. 3*, pp. 4–5 of the score (extremely low register)
Stravinsky, *Symphony in Three Movements*, third movement (horn glissando)
Wagner, *Siegfried Idyll*, horn trill at "Lebhaft"
Dvorak, *Symphony No. 8*, last movement after [R] (horn trills)
Wagner, *Das Rheingold*, Prelude (8 horns)

Trombone:
Berlioz, *Requiem*, pedal tones in "Hostias" movement at [74]
Wagner, *Das Rheingold*, pp. 98–104 of the score (solo against full orchestra)
Rimsky-Korsakov, *Russian Easter Overture*, solo at [M]
Ravel, *Bolero*, pp. 28–29 of score
Hindemith, *Mathis der Maler*, first movement opening

Tuba:
Shostakovich, *Symphony No. 1*, third movement, beginning
Chavez, *Symphony No. 6*, third movement, beginning
Stravinsky, *Petrushka*, Fourth tableau, "Dance of the Peasant and the Bear"
Gershwin, *An American in Paris*, p. 83
Respighi, *I Pini di Roma*, last movement
Berlioz, *Benvenuto Cellini*, Overture

11

Scoring for Brass, and Brass Combined with Strings and Winds

EARLY USES OF THE BRASS CHOIR

The brass choir of the modern symphony orchestra contains some of the oldest instruments in existence, yet is the last of the major choirs to be fully emancipated. This is mainly due to the reluctance of many nineteenth-century composers to accept the mechanical advances in the construction of the trumpets and the horns. We can only speculate that Wagner and Brahms, who did use valve trumpets and horns in some works, must have preferred the sound of the natural instruments. Nevertheless, since the latter part of the nineteenth century, the brass choir has certainly gained wider acceptance, and the novice must be warned not to overuse this most powerful sound resource, for it can easily overshadow the rest of the orchestra. In order to learn how to use the brass section to greatest advantage, let us look at a series of examples illustrating its development from a solo choir in the Renaissance through its more selective uses in the Baroque period, its discreet appearance in the Classical and early Romantic orchestra, and finally its total liberation in the late nineteenth to early twentieth century. Before we begin exposing the pragmatic history of the brass choir, let us cover some essential preliminaries.

It is not possible to establish any kind of pattern before the Classical period, in regard to number or kinds of brass instruments in

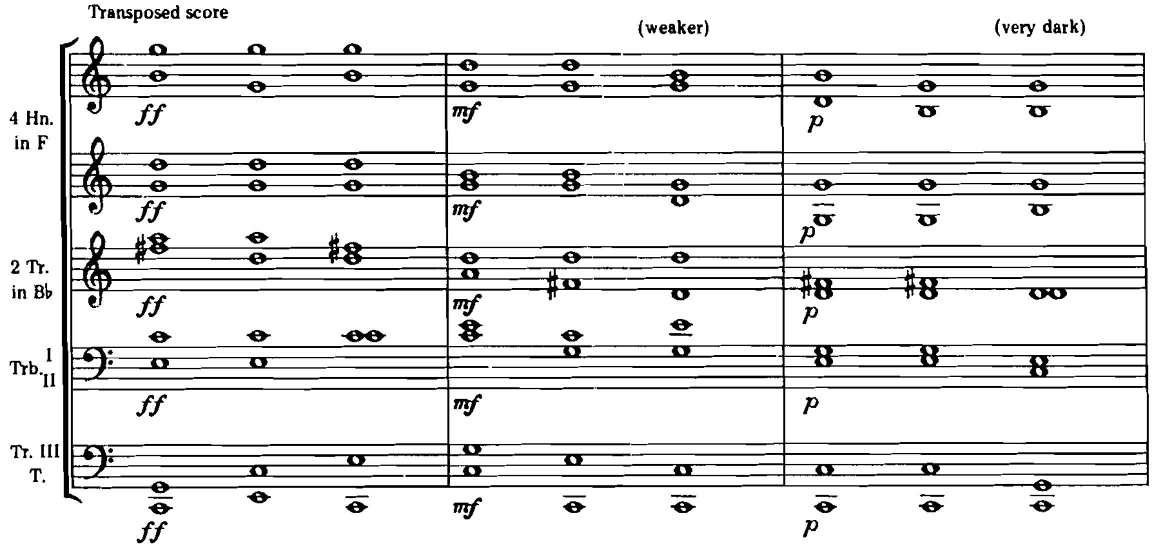
common use. The doublings of the instruments depended on the size of the room and the availability of players in the Renaissance. In the Baroque, two or three horns were usually used, most often with three trumpets, and almost always coupled with timpani; the trombones were used in threes. This sounds like a large complement, but, except for some "battle pieces," outdoor works like Handel's *Water Music*, and a few operatic scenes, the brass were rarely if ever used all together. We have instances of them being used in the same work but usually in different movements. If one hears a Baroque work with trumpets, horns, and trombones playing in unison or octaves, it is probably an arrangement, not an original.

Once the orchestral section was established in the late Classical period, two horns, two trumpets, and three trombones were the norm, with the tuba added just a bit later. Then the section grew to four horns, with the rest of the complement remaining the same. This meant that a brass chord could contain nine different notes. When the brass section expanded to four horns, three trumpets, three trombones, and tuba, as is usual today, eleven notes are available. In simple four-part chords, that means doubling. One way of viewing this doubling question is worth remembering: when the dynamic is *mf* or less, each brass instrument may be assigned a separate pitch and perform it successfully, depending on the register placement. If the dynamic is louder than *mf*, it is advisable to double the horns, meaning that two horns in unison equal the power of one trumpet or one trombone. That does not hold true if the trumpet is in a low register, but it is generally a good rule to keep in mind. Here are some successful chords scored for brass. The techniques of juxtaposition, interlocking, enclosure, and overlapping which were discussed in Chapter VIII (on pp. 219–22) also apply to the scoring of brass chords.

All the notes are at concert pitch:

Example XI–1





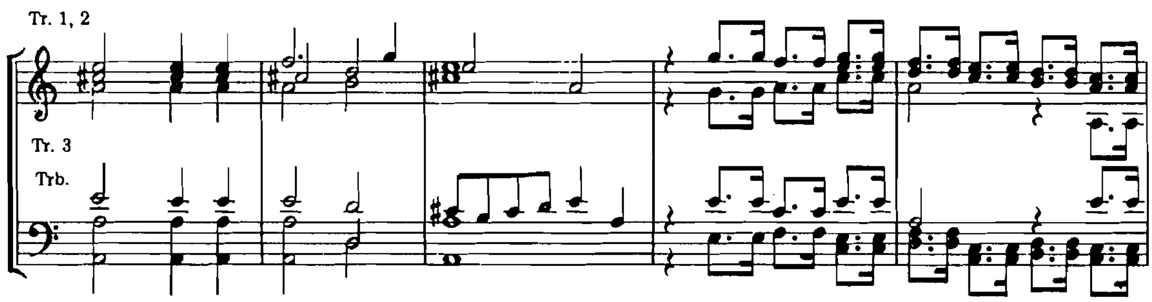
The major uses of the brass choir in the orchestra are:

1. as a homophonic unit;
2. to strengthen and clarify the harmony (The pedal technique of the Classical period is included under this rubric);
3. to state a melody;
4. as melodic doublers;
5. to build climaxes;
6. as independent voices in a contrapuntal setup;
7. for special effects (muted, jazzy, band, more contemporary sounds).

Before we discuss any of these normal orchestral functions, let us look at some typical Renaissance and Baroque uses, keeping in mind that the clarino style of trumpet playing was very much in vogue during these periods, as was the high register of the horn.

The interlude from *In ecclesiis* by Giovanni Gabrieli (1557–1612) was probably performed by three trumpets and three trombones. These may have been doubled and played from both balconies at St. Mark's in Venice.

Example XI–2. Gabrieli, *In ecclesiis*, mm. 51–67

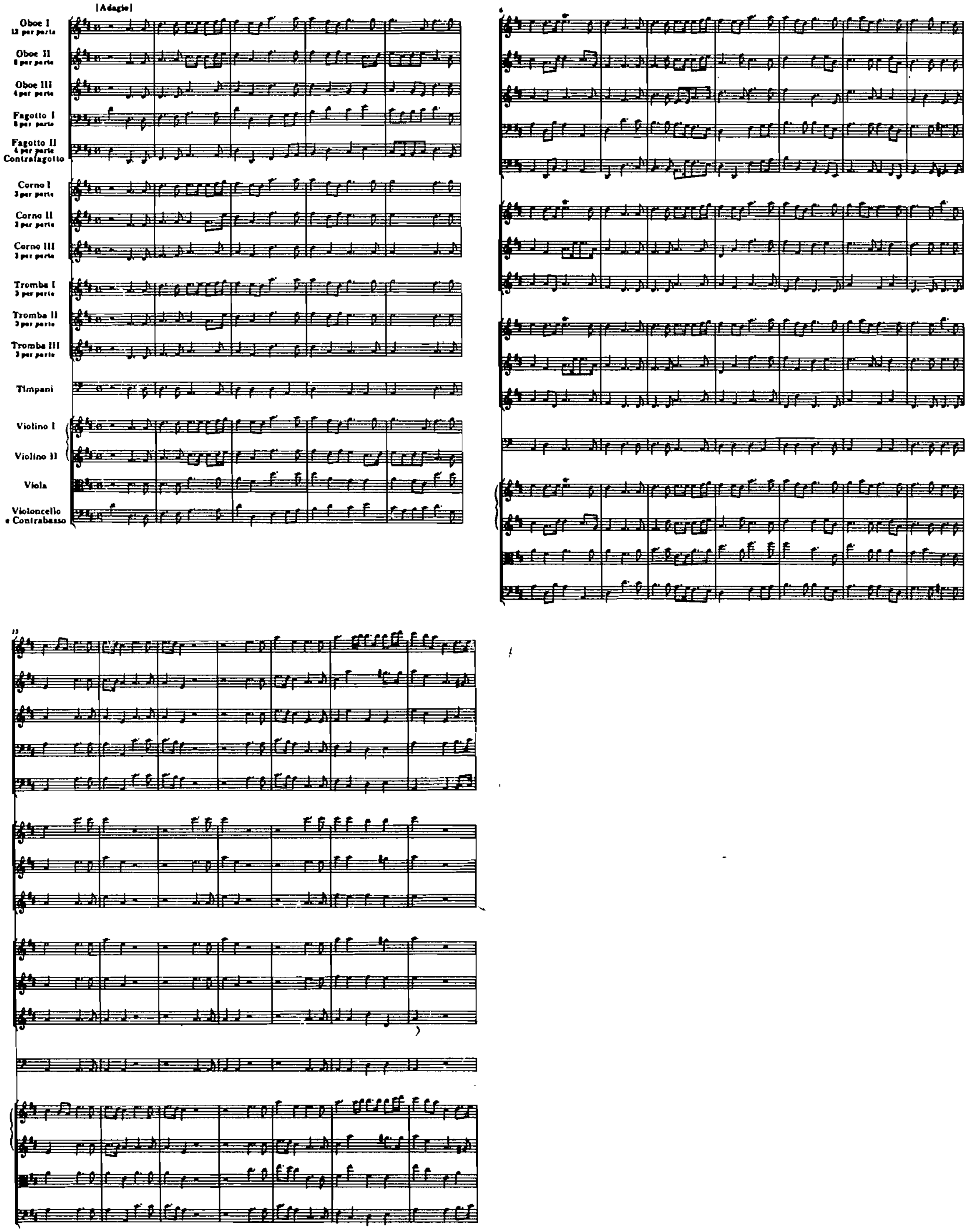




A more "orchestral" example from the Baroque period is this noble opening of the *Fireworks Music*, by G. F. Handel (see Example XI–3 on p. 331). This is purely homophonic and resembles the Gabrieli, but with the three horns doubling the three trumpet parts. Later on in the work the two groups of brasses are used antiphonally in chorale style, similar to the opening. In this score all instruments are in C, but originally both horns and trumpets were in D and played in octaves, not unison.

At the height of the Classical period, trombones were not included in most symphonies, although they were still standard in the opera and church orchestra. Beethoven waits until the final movement of the *Fifth Symphony* to introduce the trombones, which contributes to a tremendously climactic feeling. (See Example XI–4 on p. 332.) This is certainly a most effective use of the brass choir. When the brass is scored in this kind of a bombastic way throughout a work continuously, the resulting sound gets very tiresome, and robs the climactic passages of their full power and majesty. Notice how much more versatile the trombones are than the horns and trumpets, which get stuck on the tonic and dominant notes once the initial fanfare chord is over.

Example XI–3. Handel, *Royal Fireworks Music*, Overture, mm. 1–19.



Example XI–4. Beethoven, *Symphony No. 5*, fourth movement, mm. 1–8



THE BRASS CHOIR AS A HOMOPHONIC UNIT

Now some passages to demonstrate the brass choir used homophonically both by itself or in combination, that is, doubled by the other two choirs.

First, we shall study two passages which present the brass in unison and octaves, a very strong and penetrating device.

In the third movement of Hindemith's *Nobilissima visione,* we have a most powerful presentation of the passacaglia theme by four horns (in F) with two trumpets (in C) in octaves, and three trombones doubling in unison. It is a "dark" doubling, since neither the trumpets nor the horns ever go too high. Only the trombones reach

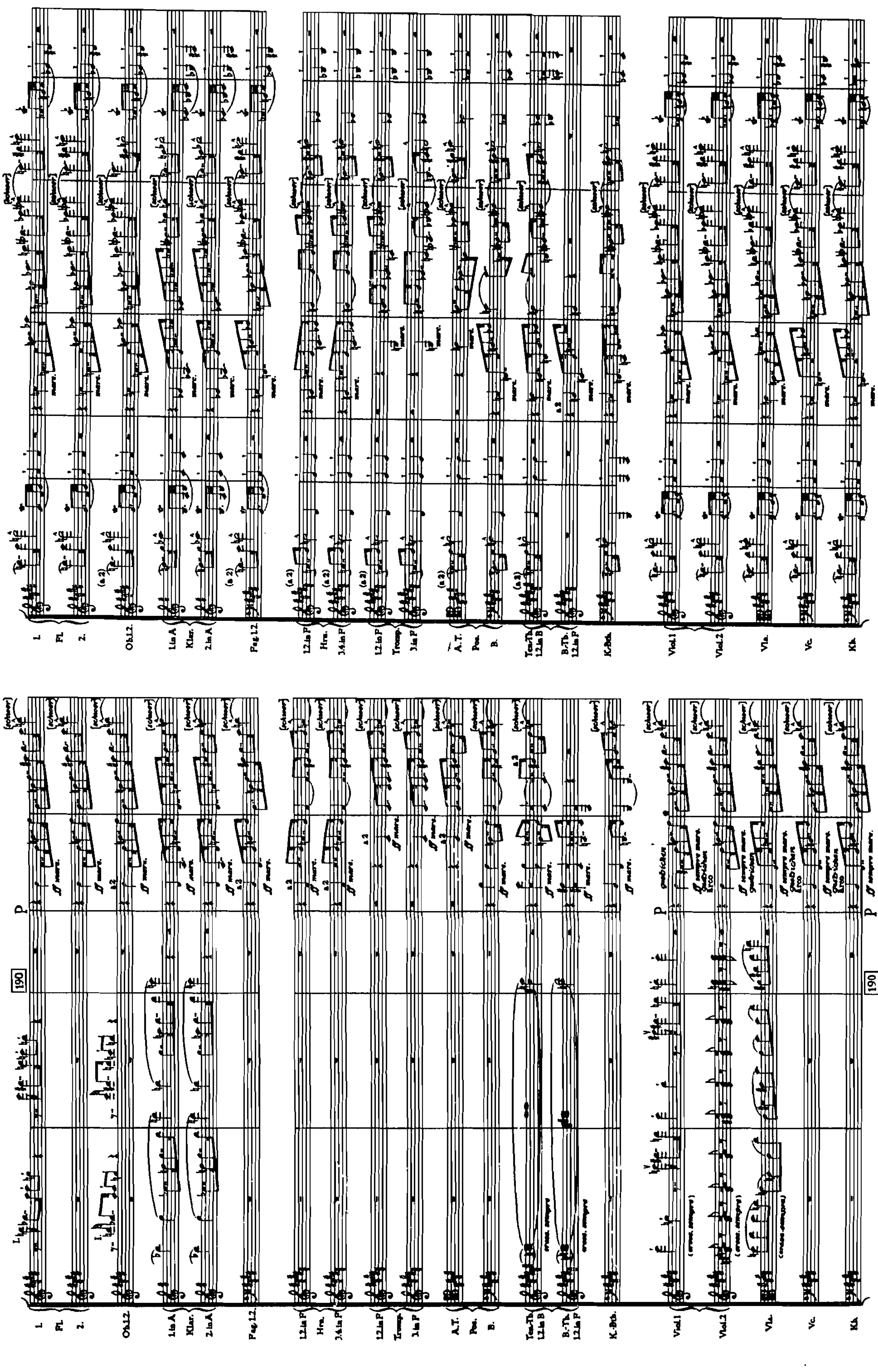
their upper range, which adds to the strength and nobility of the sound. Of course, the placement makes a difference. If Hindemith had wanted an extremely bright sound, he could have transposed it up a third or a fourth and had the trumpets and the horns at an extremely high register. The brilliance of this passage as it is scored comes from the unison of the horns and trombones rather than of blaring trumpets. In subsequent repetitions of the theme, Hindemith sometimes doubles the brasses with other members of the orchestra to give new colors. He saves the tuba to give fresh color in its presentation of the theme two octaves lower for the second variation at [34].

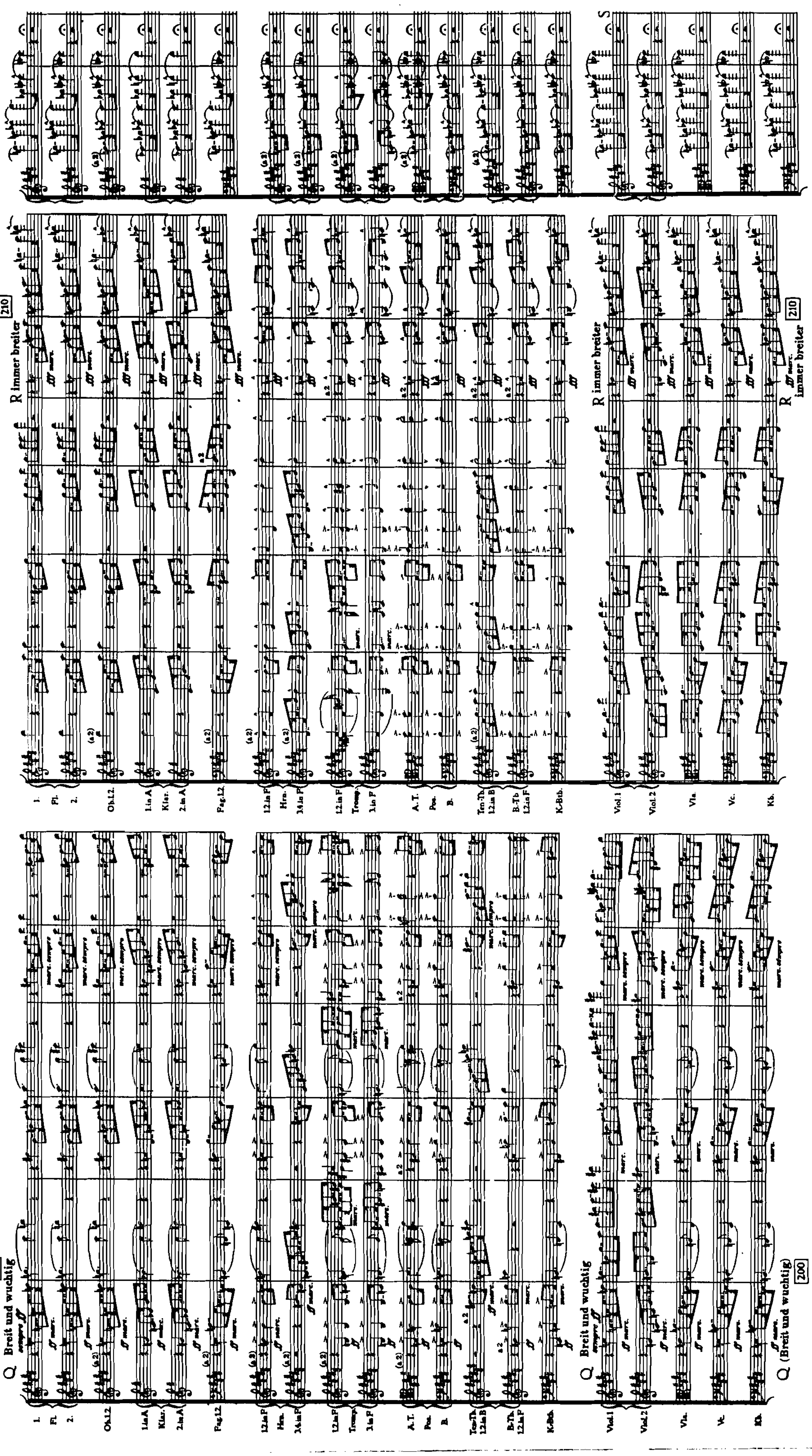
Example XI–5. Hindemith, *Nobilissima visione*, third movement (Passacaglia), mm. 1–6.



In this original version of Bruckner's *Seventh Symphony*, a huge climax is reached in the last movement with the brass, almost in unison with the rest of the orchestra, lending tremendous weight. Notice how from mm. 188–212 the brass choir is doubled very irregularly by the strings or the woodwinds. When one hears the passage, the homophonic brass seems to be its major component, with the other instruments coloring some but not all the pitches. At m. 212 then, one measure is still in quasi-unison to recall the entire passage; thereafter, in m. 210 we finally build the climax with octaves. Study these measures carefully; remember that bass tubas are written in the old-fashioned system and therefore must be read: B♭ tenor tubas a major ninth below, F bass tubas a perfect twelfth below, and the contrabass tuba at pitch.

Example XI–6. Bruckner, *Symphony No. 7*, last movement, mm. 188–212




Q Breit und wuchtig
200
R immer breiter
210
S
Fl.
Ob. 1.2
Klar.
Fag. 1.2
Hrn.
Tromp.
Pos.
Ten-Tb.
B-Tb.
K-Btb.
Viol. 1
Viol. 2
Vla.
Vc.
Kb.

Let us now examine some typical homophonic passages from the literature. When any choralelike works are studied, the spacing, voice leading, and doublings should be carefully noted. It is helpful to use different colored pencils to note the doublings, and also, of course, to make a piano reduction of a large brass ensemble in order to ascertain which pitches are the essential ones and how these have been doubled. Always be aware of the melody or melody notes the composer wishes to stress, and *why*, as well as *how* these are made to dominate.

In Stravinsky's *J. S. Bach Choral Variations*, a twentieth-century master orchestrates a Bach Christmas carol.* The voice leading,

Example XI–7. Stravinsky, *J. S. Bach Choral Variations*, mm. 1–8



*The choice of instruments for the chorale is reminiscent of the seventeenth-century brass *Turm-Musik* by people like Pezel.

which is partially Bach's and sometimes Stravinsky's, is extraordinarily interesting. This is an example of extremely thick brass writing, perhaps simulating a combination stop on an organ. If played well, it is most effective, but one has to take care that the last phrase is not muddy. We shall look at another example from these variations later on, because if a composer is asked to transcribe music from the Baroque era, he should realize, as Stravinsky did, that he must think, feel, and hear his way back into the idiom.

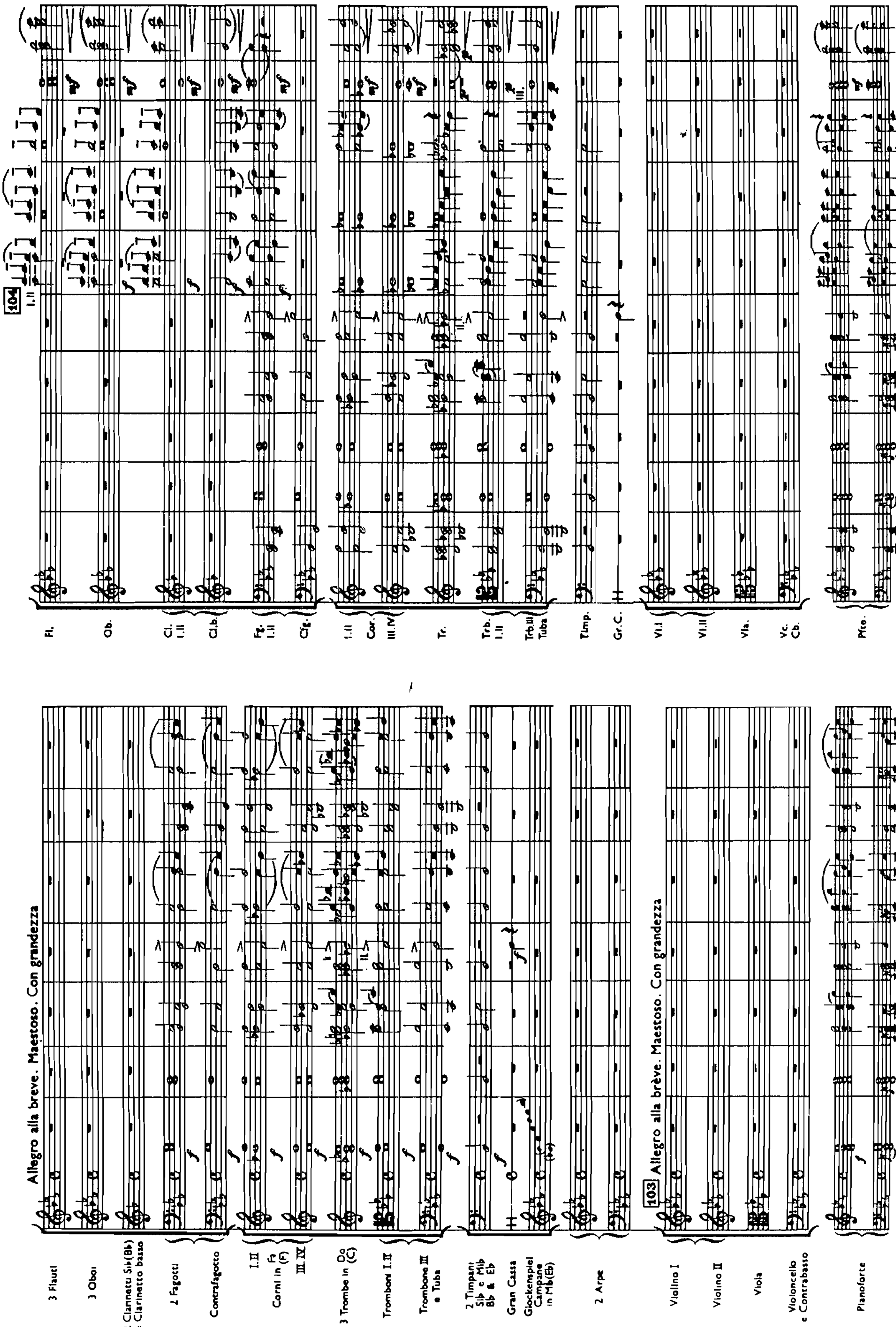
For a most impressive coda to "W.M.B." from Elgar's *Enigma Variations*, the brass again predominate in this powerful, choralelike ending. Study the doublings carefully and notice the octave and double-octave doublings so very effective in obtaining a massive sound such as this.

Example XI–8. Elgar, *Enigma Variations*, "W.M.B.," mm. 24–32



Next is the famous opening of the last movement of *Pictures at an Exhibition*, "The Great Gate of Kiev." The important fact to notice here is that Ravel fills out and doubles the bass parts with two bas-

Example XI–9. Mussorgsky-Ravel, *Pictures at an Exhibition*, "The Great Gate of Kiev," mm. 1–17



soons and a contra, leaving trombones I and II to play in their more brilliant range. Look at the original piano part, and see that the grace notes, which give greater emphasis to the bass of the piano, are disregarded in the orchestration, for they are superfluous given the strength of the tuba and contrabassoon. Strangely enough, the timpani, which usually supports the roots of the chords, gives us almost a pedal on B♭ instead. This is an interesting detail and lends an introductory flavor to this chorale which is resolved when the winds come in at m. 13 and E♭ is predominant.

COMBINATIONS FOR MELODIC PRESENTATION

There are, of course, hundreds of examples in which brass instruments are used as soloists either alone or in combination. Some of these solos were excerpted in the previous two chapters, but we shall look at a few combinations that will implant new sounds in the orchestrator's ear. These are colors he may use whenever he wishes. In the chapters on individual brass instruments, we saw some examples of a melodic nature for multiple trumpets, horns, and trombones. The presentation by four horns in unison, which is usually a brilliant, high concept, has become a favorite since Wagner, Mahler, and Strauss. At this point, we will quote the advice of that excellent composer and orchestrator, Gunther Schuller, himself a horn player. Often we curse the horn players for cracking at the climax of a wonderful passage. Here are two paragraphs from a fine little book, which shed some light on this problem:

> When more than one player attempts a high passage at a loud dynamic level, unless their intonation is perfect, a curious phenomenon takes place. The fractional intonational differences set up intense vibrations, vibrations so intense in the immediate vicinity of the players (they lose in impact at a wider range, which is why very few conductors become aware of this problem), that it becomes virtually impossible for any one of the players to sustain his note. That is the reason why one hears so many cracked notes in high register unison horn passages. It is therefore advisable to orchestrate such passages, whenever possible, for first and third horn alone, or to reinforce the two horns with one trumpet.
>
> The acoustical explanation of this disturbing phenomenon is that high notes on a horn create such intensely vibrating air columns, that another player's lips and instrument, if in the immediate vicinity, are *physically* affected. If the same unison passage were attempted with each player sitting ten feet apart, the problem would (for all practical purposes) be eliminated.*

* Gunther Schuller, *Horn Technique* (Oxford University Press, 1962), pp. 82–83.

On to some combinations:

1. Usually the horn and cello double on long sustained melodies. In Example XI–10, the solo cello is given added articulation by the horns doubling the single line. The staggered effect of the four horns adds four personalities to the solo cello. Notice that the horns are in F, but the notation in the bass clef is old-fashioned, meaning the written pitches sound a perfect fourth higher.

Example XI–10. Strauss, *Don Quixote*, mm. 189–93



2. Example XI–11 illustrates the very common combination of trumpets doubling oboes or vice versa. Both have a sharp edge to their tone, and even though everything, including an organ, is playing, this doubling is powerful enough to break through.

Example XI–11. Weinberger, *Polka and Fugue*, mm. 185–91



3. In Example XI–12 on p. 342, we have a most popular doubling of trombones with bassoons, violas, cellos, and double basses. The trombones contribute great power to this tutti, and at the same time, by dropping out two trombones and leaving only the third to bolster the lower strings, Schubert orchestrates a beautiful diminuendo.

4. Another most powerful combination of trombones, horns, bassoons, and lower strings presents the "national anthem" against a very heavy orchestration of the counterpoint (see Example XI–13 on p. 342).

Example XI–12. Schubert, *Rosamunde*, Entr'acte I, mm. 106–23



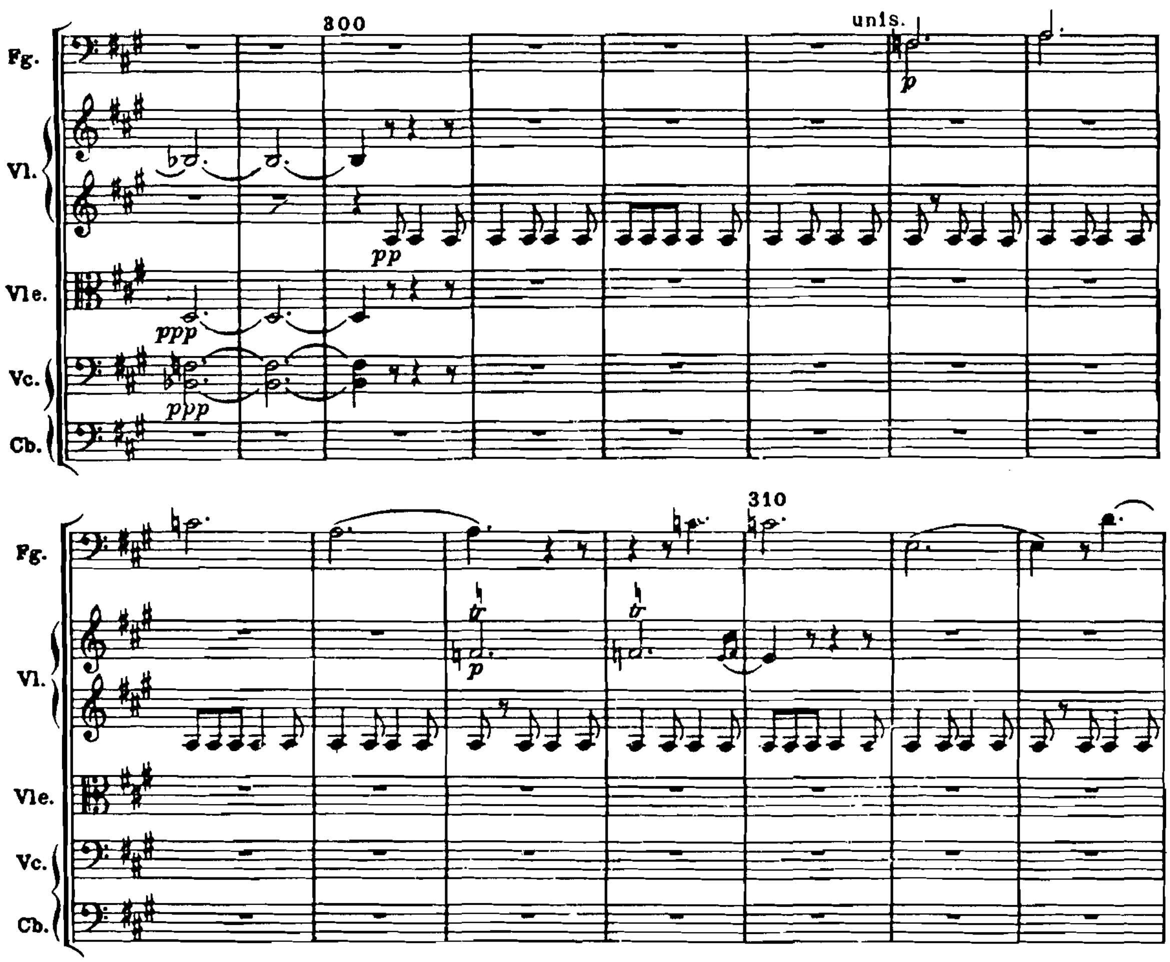
Example XI–13. Tchaikovsky, *1812 Overture*, mm. 386–98





5. This excerpt could also have been presented with the contrapuntal examples, but it is felt that the effectiveness of the canon is due more to the color contrasts than to any other musical parameter.

Example XI–14. Berlioz, *Roman Carnival Overture*, mm. 298–331




Fl.
Ob.
Fg.
Tbni.
Vl.
Vle.
Vc.
Cb.
1.
mf
a 2
mf
p
tr
p
p


Fl.
Ob.
Fg.
Tbni.
Vl.
Vle.
Vc.
Cb.
320
a 2
tr
p
tr
p



6. Here is an interesting strengthening or darkening of the bass by the tuba to give a heavy feeling to this unusual beginning of the third movement.

Example XI–15. Prokofiev, *Symphony No. 5*, third movement, mm. 1–3



7. This mysterious opening presents a tuba solo doubled by bass clarinet and bassoons, but with two different articulations. While the winds are slurred, the tuba is asked to articulate every note.

Example XI–16. Wagner, *Siegfried*, Prelude to Act III, mm. 1–7



8. Tuba plus trombones, bassoons, cellos, and basses constitute one of the most powerful combinations in the symphony orchestra.

Example XI–17. Liszt, *Les Preludes*, mm. 405–10



9. Before leaving the question of combinations, let us look at an extraordinary spot in *Lohengrin* where the strings at first double the "chorale" in the trumpets, trombones, and tuba, then the woodwinds take over the doubling, leading to a diminuendo and a gorgeous *pianissimo.*

Example XI–18. Wagner, *Lohengrin*, Prelude to Act I, mm. 50–58





Some other interesting combinations can be found in Prokofiev's *Lieutenant Kijé*, "Troika," [51], mm. 1–8, Stravinsky's *Pulcinella*, [85]–[94], Copland's *Appalachian Spring* [59]–[61], and many others.

CLIMACTIC USE OF THE BRASS

Everyone is familiar with the use of brass as an element of climax, but composers have used a variety of ways to achieve this ultimate climactic entrance of the brass. Study the following examples carefully to learn the various techniques:

1. One of the most successful ways of building climaxes is by holding back in order to save a certain color for a specific event. We have already discussed this in previous chapters. In this marvelous example, Schubert uses the trombones to introduce the closing theme, leading to the development section, and again to close the recapitulation and lead to the coda. Up to this truly mysterious moment the task of the trombones has been to double lines or to sustain chords. Here they offer an entirely new sound color, adding clarity to the moment and to the entire form of the movement.

Example XI–19. Schubert, *Symphony No. 9*, first movement, mm. 198–231



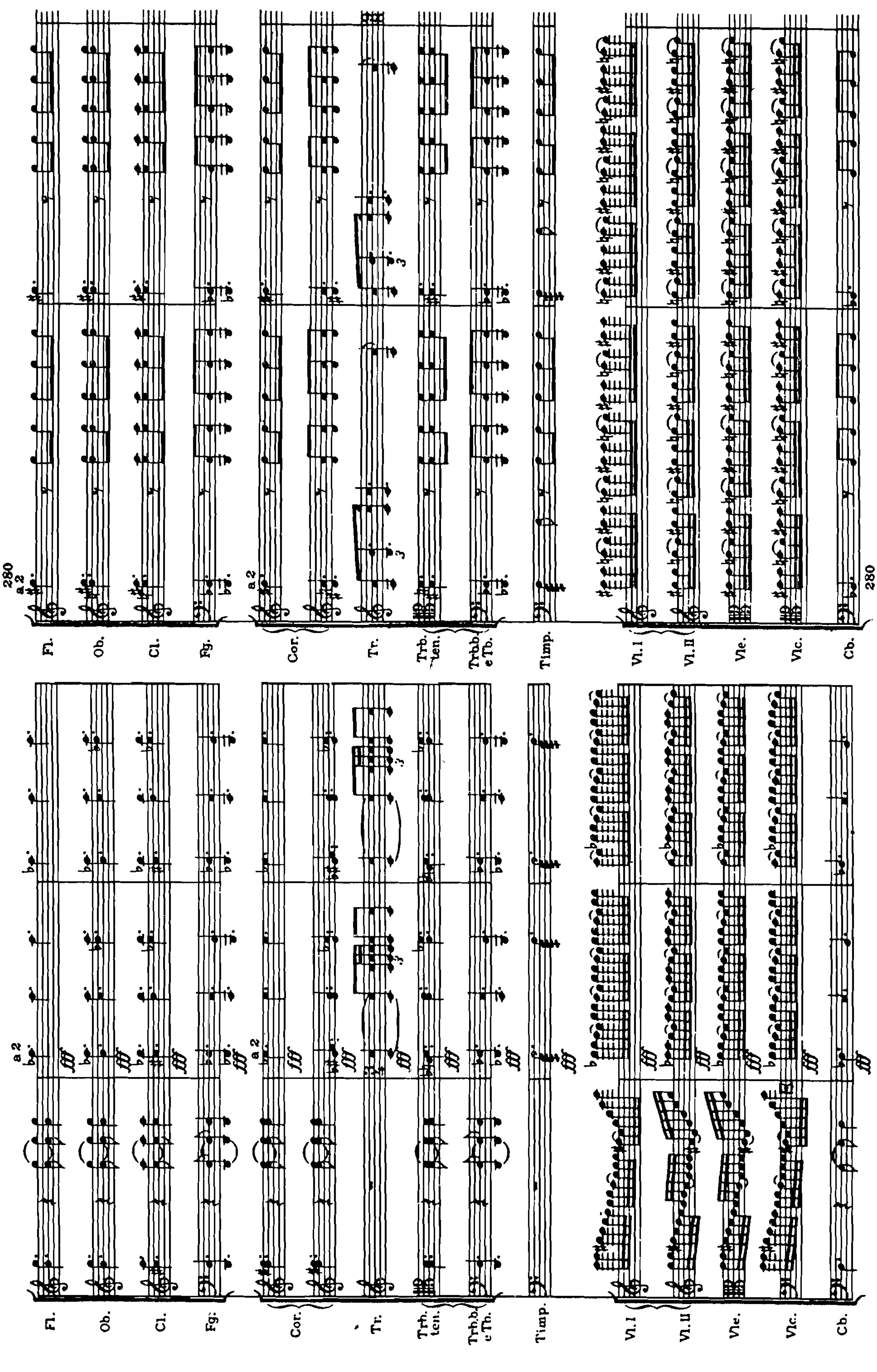
2. Here we have a situation where the alternation between choirs leads to a climax not by the brass but by the rest of the orchestra plus horns in their woodwind capacity. Franck calls for trumpets as well as piston (valve) cornets, but the latter are usually performed on trumpets in the modern symphony orchestra.

Example XI–20. Franck, *Symphony in D minor*, third movement, mm. 74–87

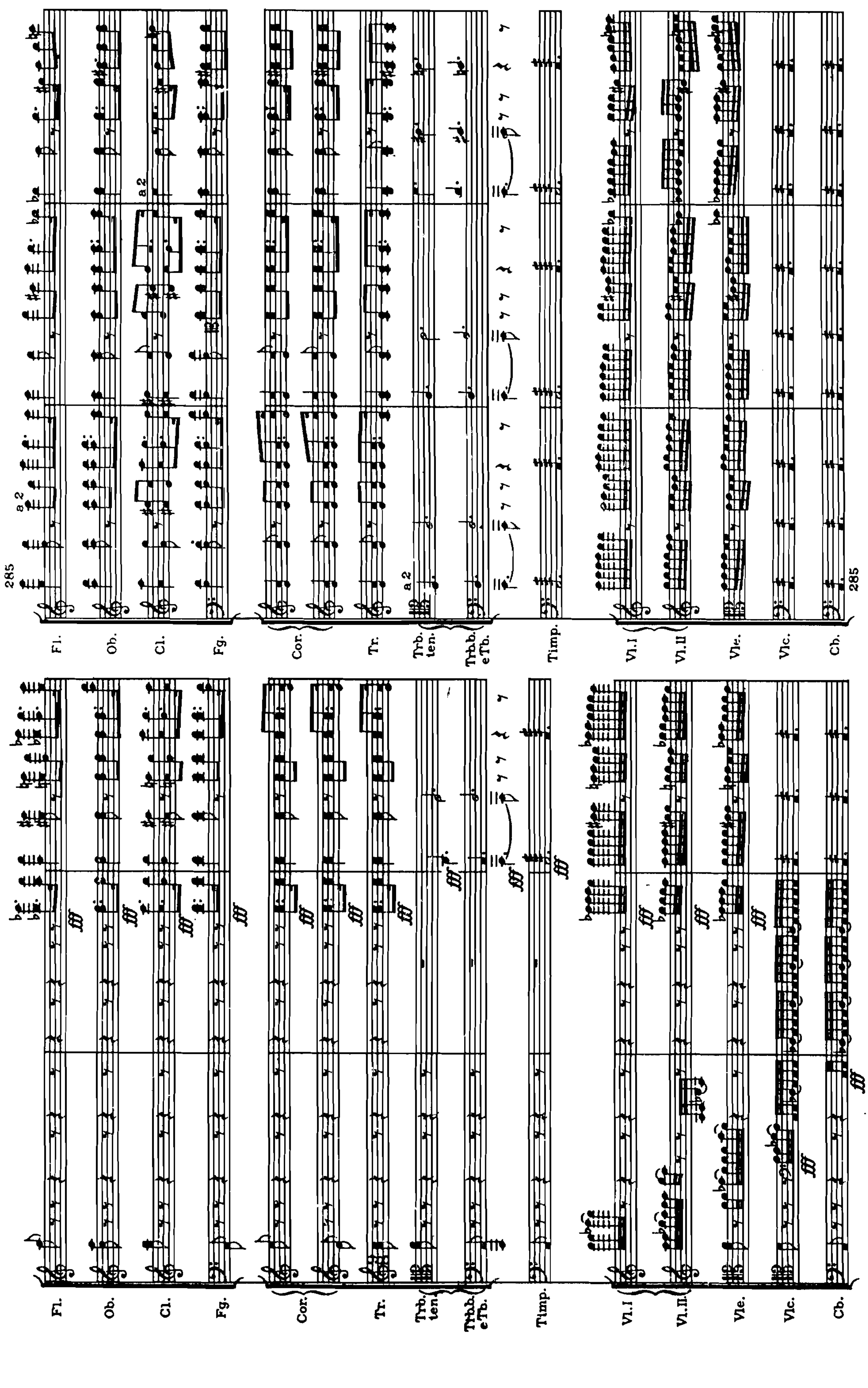


3. Tchaikovsky was a master climax builder; although many criticize him for often overdoing this effect, he knew the technique, and we should profit from this. He has already reached a big climax in m. 278 of Example XI–21, where he reintroduces the opening flourish for the third time, except with a new agitated string counterpoint. This suddenly breaks off, and the strings dwindle down to the cellos and basses only. Suddenly a huge tutti begins the recapitulation of the movement, and the composer adds, besides the timpani roll, a powerful new thematic element (*cantus firmus*) against other previously heard contrapuntal fragments.

There are almost as many instances of this effect as there are works in the orchestral repertoire, and we shall examine some others in Chapter 14.



Example XI–21. Tchaikovsky, Symphony No. 4, first movement, mm. 277–90


Fl.
Ob.
Cl.
Fg.
Cor.
Tr.
Trb. ten.
Trbb. e Tb.
Timp.
Vl. I
Vl. II
Vle.
Vlc.
Cb.
fff
285
a 2



CONTRAPUNTAL BRASS WRITING

We turn now to some examples of contrapuntal brass writing. In Renaissance music and in the works of some later composers (Handel and Berlioz, in particular), the antiphonal effect was often used, but we shall limit ourselves to other kinds of imitation and freer contrapuntal writing.

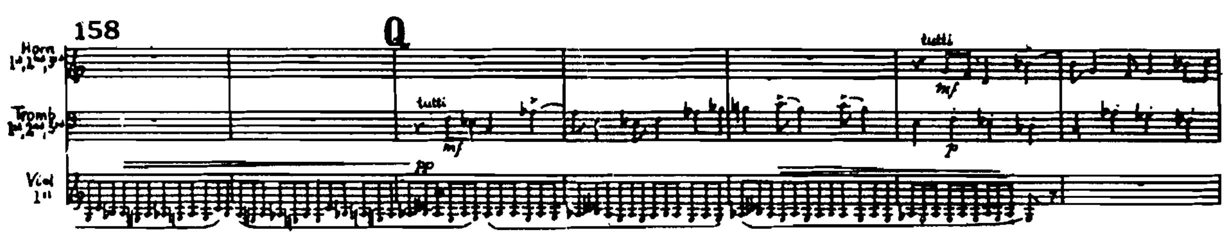
1. In Variation IV of this work, Stravinsky orchestrates with trumpets, trombones, flutes, and bassoons in a simulation of the Baroque style, while the violas, cellos, and bassoons double the chorus. Even though the trumpets are not too high, they play a clarino-type part.

Example XI–22. Stravinsky, *J. S. Bach Choral Variations*, Variation IV, mm. 1–6



2. Here is a most effective fugato for the entire brass choir, which ends with the brass punctuating the theme as presented by the timpani (see m. 192). Notice that all the instruments are in their very best registers, so that the subject comes through clearly every time it is played. The punctuation at * is a most common use of the brasses, a favorite device of Hindemith and many other composers as well.

Example XI–23. Hindemith, *Symphonic Metamorphoses*, second movement, mm. 158–96




165
Horn 1st, 2nd, 3rd
Trump. 1st, 2nd
both
1st
Tromb.
both
2nd 3rd
Tuba
173
1st
2nd
Horn
3rd
4th
1st
Trump.
2nd
R
1st
Tromb.
2nd
3rd
Tuba
181
1st
2nd
Horn
3rd
4th
1st
Trump.
2nd
1st
Trom.
2nd 3rd
Tuba
S



Hindemith, *Symphonic Metamorphoses*, © Associated Music Publishers Inc., New York, 1945; © Assigned to B. Schott's Soehne, 1946; © renewed; All Rights Reserved; Used by permission of European American Music Distributors Corporation, sole U.S. and Canadian agent for B. Schott's Soehne.

3. One of the best known and most quoted brass passages in twentieth-century orchestral literature comes from the first movement of Bartók's *Concerto for Orchestra* (see Example XI–24 on pp. 358–60). The fugato is presented by the trumpets and trombones, then inverted by the horns plus the entire choir. Here again, as in many examples that we have studied, the composer equates the strength of two horns in unison with that of one trumpet or one trombone. The effect of the stretto from m. 363 to m. 386 is especially thrilling.

4. We will end this section on the brass choir with an incredible passage from the first of Schoenberg's *Five Pieces*. (See Example XI–25 on pp. 361–62.) All brasses are muted (straight mutes), and all are expected to play loud, except for the *ffpp* at m. 73, culminating in the fluttertongue. Notice the wonderful independence of the trombones against the trumpets and winds and the exuberant horn calls. The fluttertongue at the end is quite a surprise after all that counterpoint.

Schoenberg was an extraordinary orchestrator who gave very significant parts to previously neglected members of the orchestra, such as the tuba, double bass, contrabassoon, even mandolin. In studying orchestral techniques of our century, no one should overlook such valuable scores as Schoenberg's *Gurrelieder*, the opera *Erwartung*, and certainly the *Five Pieces for Orchestra*.

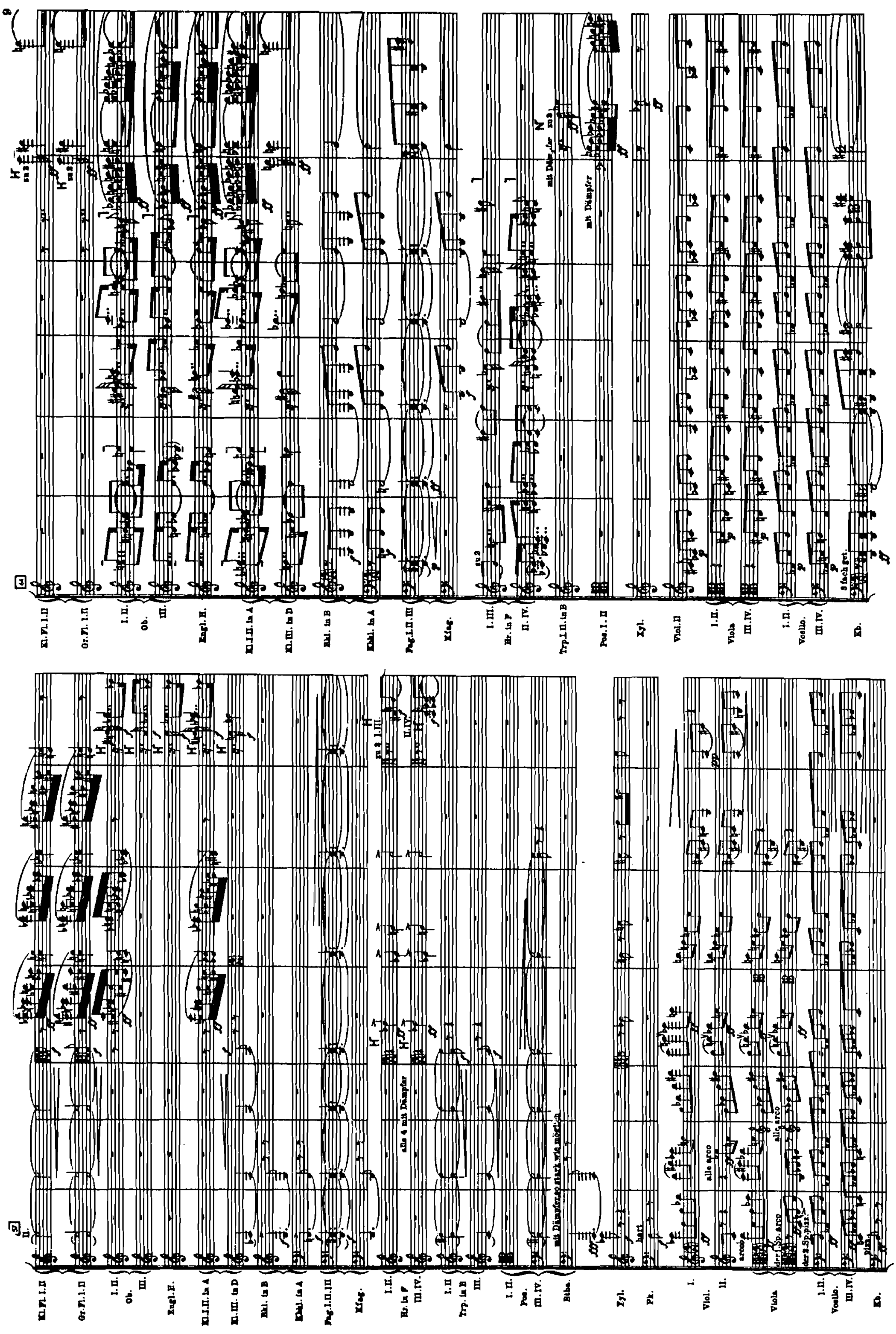
Example XI–24. Bartók, *Concerto for Orchestra*, first movement, mm. 313–87

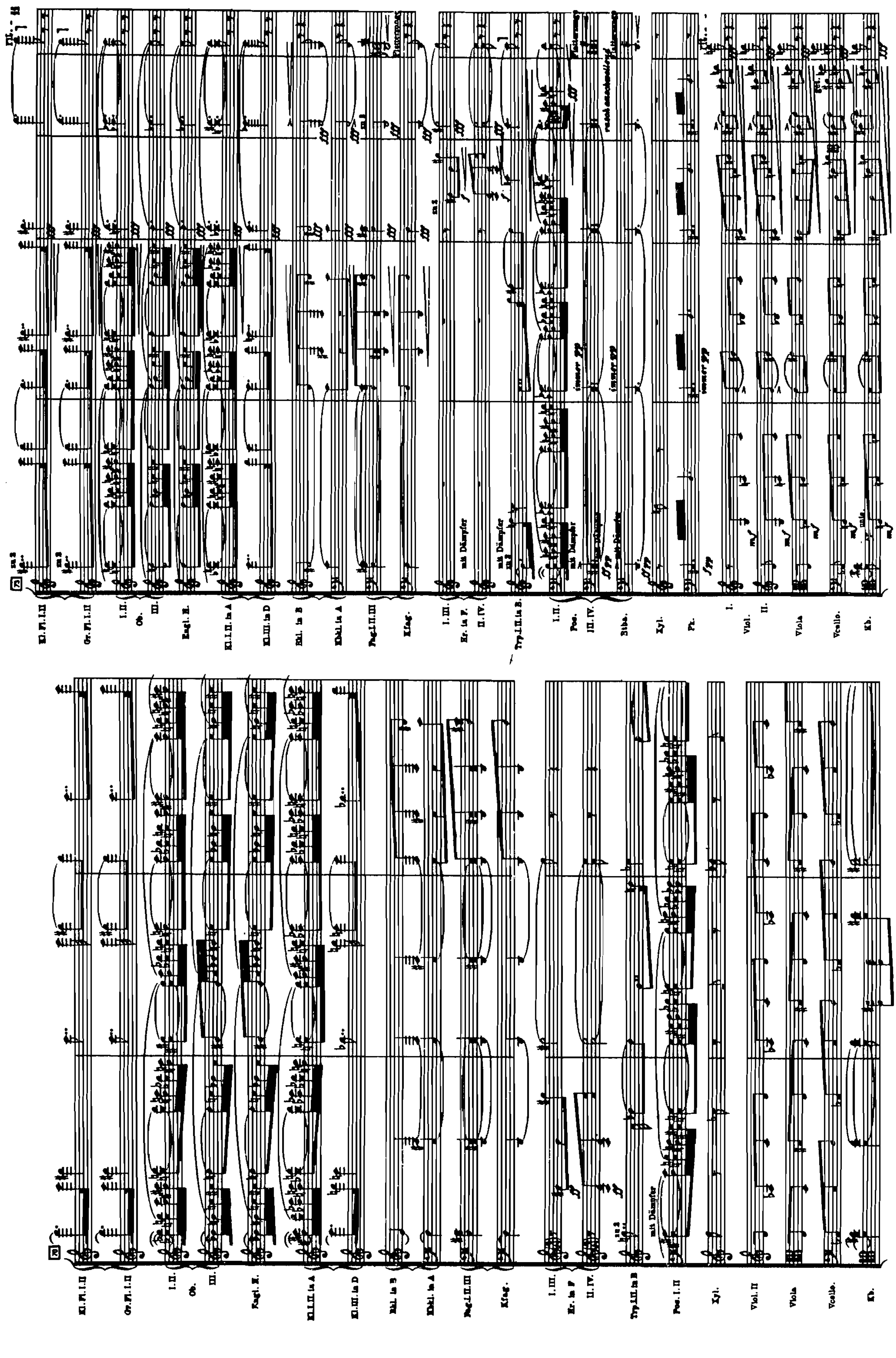



342
349
Flts. I,II,III
Obs. I,II,III
Cls.I,II,III in B♭
I Bsns. II,III
I,III Hns. in F II,IV
I,II Trpts.in C III
I,II Trbs. III
Timp.
Vlns. I
Vlns. II
Vls.
Vcs.
D.Bs.
a 2
f, ben marc.
mf
354
359
364
Hns. I,III in F
I Trpts.in C
II Trpts.in C
III
II Trbs. III
marc.
f, ben marc.


376
I
Trpts.in C
II
Trpts.in C
III
I
Trbs.
II
Trbs.
III
marc.
f, marc.
marc.
f, marc.
380
386
Flts.I,II
Obs. I,II,III
Clts.I,II,III in B♭
Bsns. I,II,III
a 2
a 3
ff
I,III
Hns.in F
II,IV
cresc.
f cresc.
I,II
Trpts.in C
III
Trbs.I,II
Trb.III Tuba
f
cresc.
Vlns.I
Vlns.II
Vla.
Vcs.
D.Bs.
non div.
p, cresc.
mf, cresc.
p, cresc.
f
ff

Example XI–25. Schoenberg, *Five Pieces for Orchestra*, No. 1, "Vorgefühle," mm. 57–77





JAZZ EFFECTS AND NEW TECHNIQUES

Again, as in the discussion of the other choirs, we come to that open-ended portion of brass-choir effects that are rather new and even more personal than the mere selection of an individual instrument. Let us examine three pieces which use rather common jazz elements in the orchestra and a rather recent work that utilizes the Harmon mute in a contemporary orchestral setting.

1. This is so well known that it needs little comment, save to say that the wa-wa mute is used for trumpet as well as trombone.

Example XI–26. Gershwin, *Rhapsody in Blue* (original version for the Whiteman Band), mm. 131–37



2. Gershwin's major contribution was in the field of jazz, and when he wrote music for the concert hall, he naturally transferred his ideas to his legitimate scores. In Example XI–27 on p. 364, we have a solo by the trumpet to be played "In hat with felt crown." Notice also the *sf* > *p* muted effect that introduces the solo and is so common today.

3. Example XI–28 on p. 365 contains an effect which comes from jazz but is often used in contemporary scores to point up a final *sff*. The way it is performed is for the players to "lip and tongue hard" into the note with a slight slur from below. At this point it makes the common attack on the next note a real *forte* after the excitement of the *sff*.

4. A great deal of new brass technique can be learned from the brief excerpt on pp. 366–67. The composer uses two symbols for the mutes: △ = straight mute, ⏀ = harmon mute. The ○ means an open harmon mute, while + is the sign for closing it with the stem. We also see the *n* at the beginning of a pitch; this means that the composer wishes to have the note begin from *niente* (nothing), or in some cases go to *n*, *niente*. Notice that some instruments are open and some closed. This score is meticulously marked, and that is exactly what one must do, especially if the players have a great many

Example XI–27. Gershwin, *Concerto in F*, second movement, mm. 31–44



Example XI–28. Gould, *Interplay*, fourth movement, 5 mm. before [21]

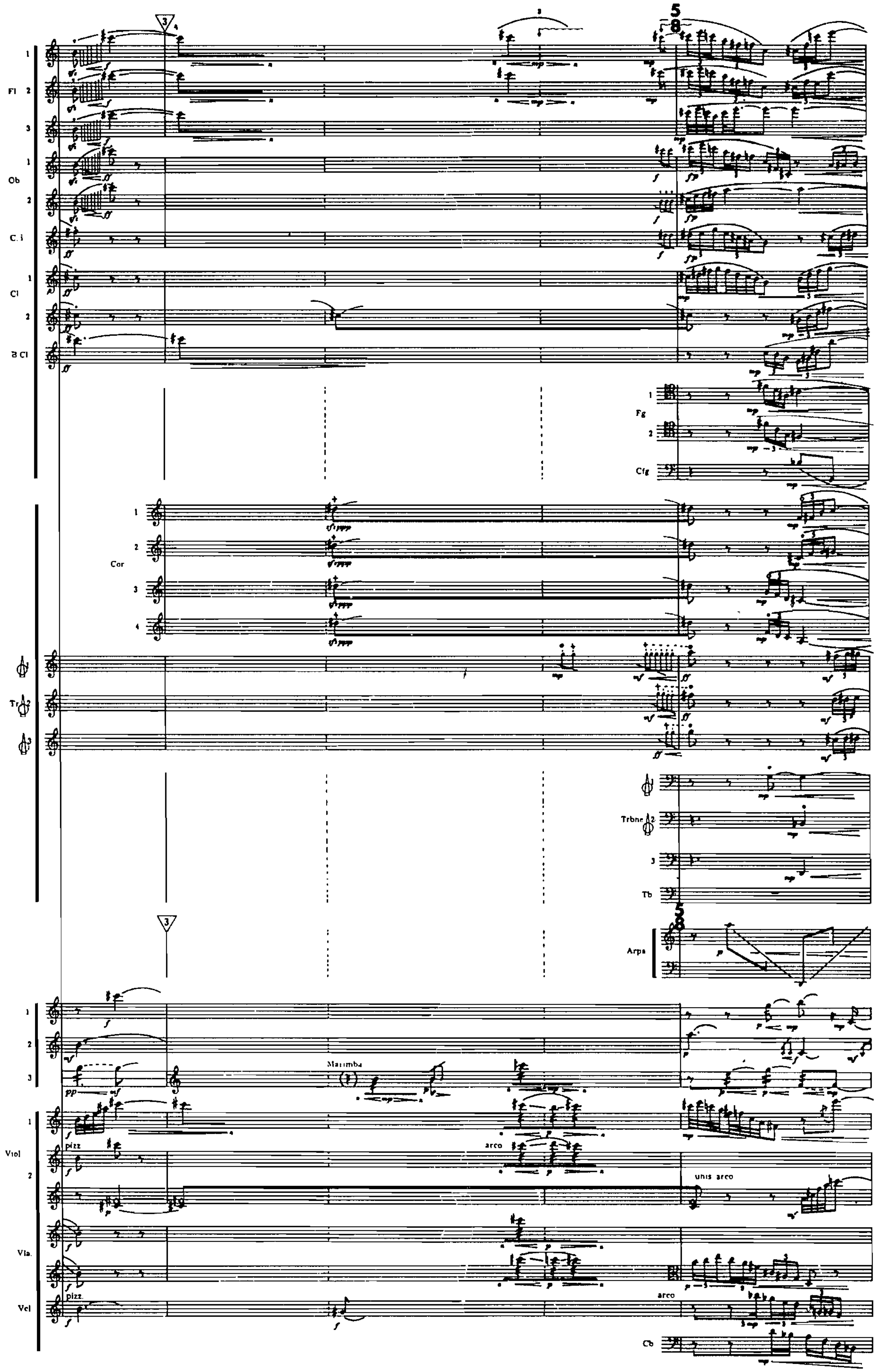


instructions with which to cope. The brass and the other choirs are treated with equality, and the writing in this work is a testament to the complete emancipation of the brass choir in our time.

Additional examples of effective brass writing:

Wagner, *Rienzi* Overture (*Allegro energico*)
Sibelius, *Symphony No. 2*, after Trio repetition
Janáček, *Sinfonietta*, Opening
Dukas, *La Péri*, "Fanfare"
Stravinsky, March from *L'histoire du soldat* (cornet and trombone)

Example XI–29. Druckman, *Windows*, mm. 4–10




decresc. with Tam-Tams
Fl
Ob
C i
Cl
B Cl
Fag
Cfg
Cor
Tr
Trbne
Tb
Arpa
Perc
senza sord
2 Soli
gli altri
Viol
Vla
Vcl
Cb.
solo
div
poco sfz p

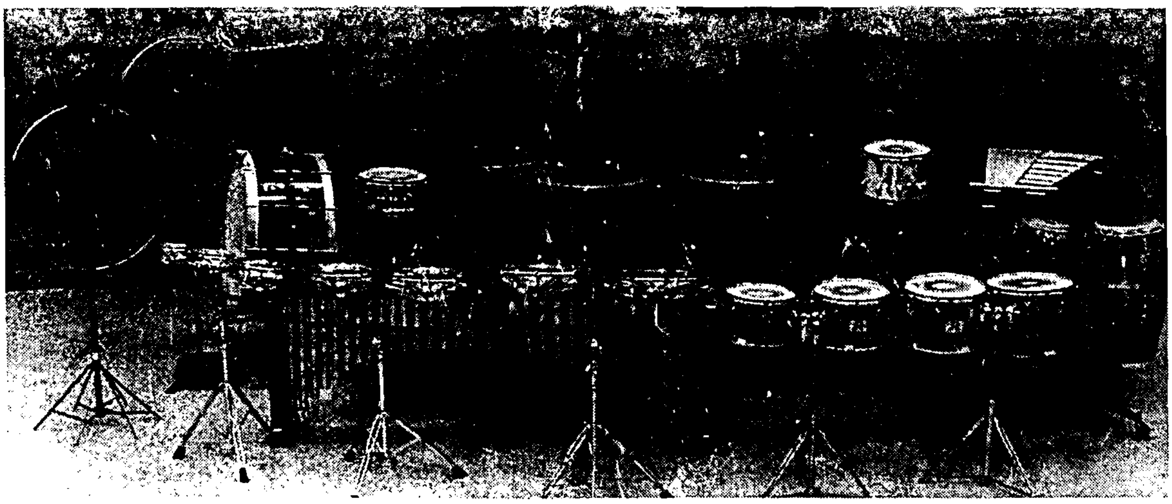
12

The Percussion Ensemble

The number of percussion instruments available to the contemporary composer or orchestrator is virtually unlimited. This embarrassment of riches is attributable to the fact that percussionists will go to any length to satisfy a composer's wishes, even to the extent of constructing new instruments on demand. Therefore, it is impossible for any book, even a specialized one on percussion only, to be all-inclusive. It is safe to say that even the most recent inventions, unless they are electronically manipulated, are related by the material of which they are constructed, the manner in which they are performed, or whether they are pitched or non-pitched to one of the four major categories of percussion instruments. Discussion of these categories will be found on the next few pages.

Walter Piston, in an orchestration class, once said to his students, "When you write a fortissimo for the timpani doubled by bass drum, don't expect to hear anything else from the rest of the orchestra." While this may be a bit of an exaggeration, it is an admonition to be considered very seriously. A thoughtful study of the next three chapters should, however, enable the composer or orchestrator to use this most colorful and versatile section of the orchestra to its maximum effectiveness.

Percussion instruments have been with us since the dawn of mankind, especially in the highly developed folk cultures of the Far East and Africa. Only in the past century has the composer of concert music become aware of their expressive potential. During the seventeenth and eighteenth centuries, a few percussion instruments stemming, as one author puts it, from "Turkish military music," were



From left to right, in front: small gong, roto toms, marimba, tom-toms, and conga drums; in middle at right: vibraphone; in back: large gong (tam-tam), bass drum, chimes, snare drum, timpani, suspended cymbals, tenor drum, orchestral bells, and xylophone.

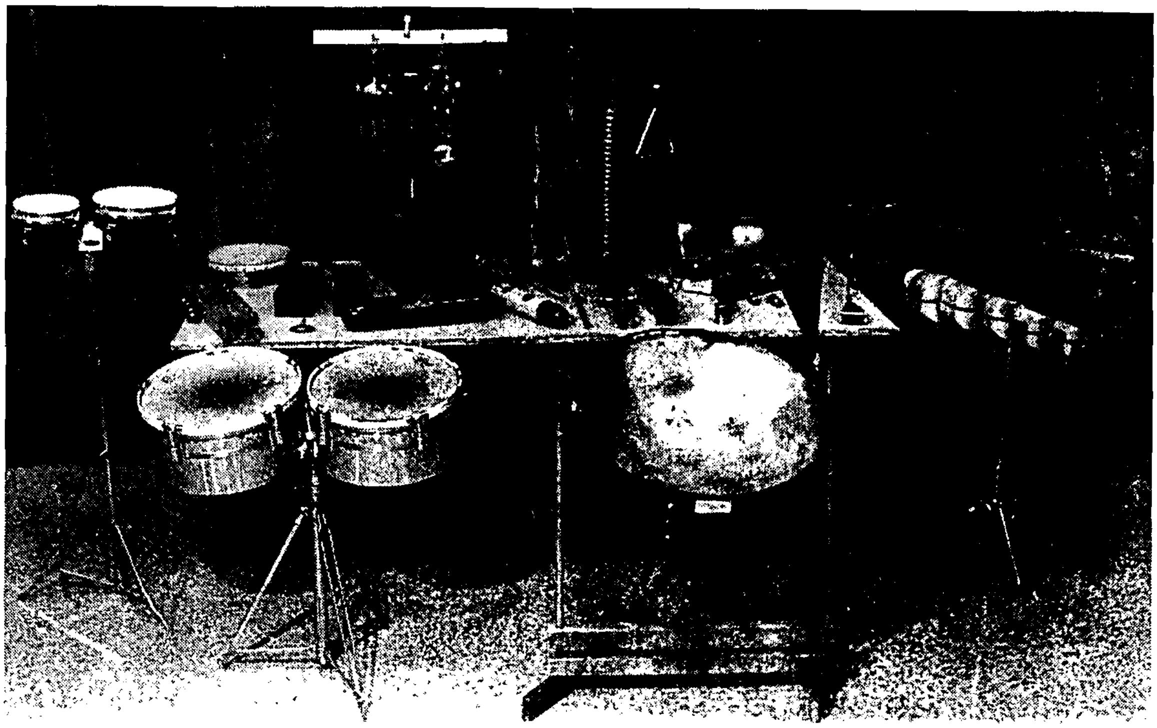
extensively used in operatic scores. These included snare drums, triangles, cymbals, and small gongs, plus castanets and tambourines adopted from the Mediterranean region. A few other instruments put in rare appearances in toy symphonies, and Bach includes a bell as the symbol of the tolling death knell in his cantata *Schlage doch gewünschte Stunde.** The timpani became fashionable in King Henry VIII's time, and Purcell was the first major composer to realize the possibility of using cavalry drums for orchestral purposes. These drums had been imported from Germany for army use, and eventually became the basis for the modern timpani or kettledrums.

REVIEW OF CATEGORIES

There are several ways of catagorizing this large "kitchen" of instruments: by the way they produce the sound; by the material of which they are made; or by their native origins. For our purpose, we shall follow the first alternative along the lines established by Erich Hornbostel and Curt Sachs. The four categories are: idiophones, membranophones, chordaphones, and aerophones. Each broad group will then be divided into:

1. instruments of definite pitch;
2. instruments of indefinite pitch;
3. instruments which, even though considered of indefinite pitch, can be tuned to approximate pitches.

*According to the musicologist Gerhard Herz, this cantata is not by Bach, but by Melchior Hoffman. Since most music publishers have not kept up with music scholarship, we retain the old attribution for ease of access to the score.



From left to right, around table: bongos, timbales, steel drum, temple blocks, and crotales; on table: sleighbells, tambourine, woodblocks, slit drum, wooden shaker, autohorn, guiro, flexatone, maracas, slapstick, bell tree, triangle, anvil, cowbell, sandpaper blocks, claves, vibrasnap, musical saw, and whistles; behind table, wind chimes.

I. *Idiophones* produce their sound by the vibration of the entire body of the instrument. Triangles, cymbals, wood blocks, etc., are such instruments, but there are some, like marimbas, vibraphones, and chimes, which are constructed of several vibrating bodies combined into one instrument. In order to produce a sound on an idiophone, any one of a number of techniques may be employed: They may be struck, scraped, shaken, or stroked.

II. *Membranophones* produce their sound by the vibration of a skin or membrane tightly stretched and fastened over a resonating shell or tube. The resonator may be open at one end (bongos, tambourine, etc.) or completely closed, as in the case of the timpani. Some mebranophones, such as snare, tenor, and bass drum, have two membranes. One of them is struck while the other vibrates "in sympathy." Membranophones are also usually struck with some kind of a beater or by the hand to produce the vibration, hence the sound.

III. *Chordaphones* produce their sound by the vibration of their strings when struck. The sound is amplified by a resonator, which may be a case, a board, a box, or a combination of these. All chordaphones are tuned instruments. The piano, harpsichord, etc., will be discussed in a separate keyboard chapter, although they are usually considered percussion instruments when used in the modern sym-

phony orchestra as members rather than soloists. On the other hand, the cimbalon, which does not exactly conform with the other keyboard instruments, will be covered in this chapter.

IV. *Aerophones* produce their sound by causing an air column to vibrate within an enclosed body, like woodwind and brass instruments. All kinds of whistles, sirens, and machines (like the wind machine) are included in this category. While all have definite pitch, their pitch is not always specified.

Today, electronic techniques and instruments are used to amplify and distort many percussion instruments, such as the echoplex, and even synthesizers are considered part of the percussion ensemble. These will be discussed briefly at the end of this chapter.

Idiophones and membranophones will be subdivided into pitched and nonpitched classes, but it is very important to understand the concept of definite pitch in relation to all percussion instruments. The dividing line between definite and indefinite pitch is not at all well defined. The inharmonic (meaning discordant) partials and the noise factor of a definitely pitched percussion instrument are at times so pronounced that our ear often tolerates deviations from the prescribed pitch which we would never accept from other instruments of the orchestra. Richard Strauss, in his revision of Berlioz's *Treatise*, calls attention to several "out-of-the-harmony" pitches assigned to the timpani by such composers as Beethoven and Verdi, where retuning to the correct pitch was impossible because there was not enough time. Nonetheless, if the pitches were close to the "required" one (a second away), the entire chord was played over the "wrong" timpani note. Although neither Strauss nor any of us today would advocate this practice, especially on the precisely tuned contemporary timpani, it proves how deceptive the actual pitch of a definitely pitched percussion instrument can be. On the other hand, the nonpitched instruments and those with approximate pitches, such as high, medium, and low, blend in with the definite pitches around them in the orchestra, pick up fundamentals which make them consonant contributors to the chord, and give the lie to the notion that nonpitched percussion instruments are simply "noisemakers."

Notation

Even though many attempts have been made to standardize percussion notation or even to agree on a symbolic designation for each of the many instruments, such agreement has not as yet been reached. A helpful suggestion would be that the notation should show in the clearest possible manner what the performer is to play.

If symbolic designations are contained in a score, the composer must explain these both in the score and at the beginning of the part, so that the player can easily identify them. Otherwise, it is incumbent on the composer to label the various instruments as they occur in the work by their full names or appropriate abbreviations. In this rather brief study of the great variety of percussion instruments, the symbol for each will be given, and a short example provided to illustrate the notation.*

Number of Percussion Players

In symphonic circles the timpani are considered separate members of the percussion section. The reason for that is probably the longevity of the timpani as a regular member of the orchestra and the fact that the timpanist always plays that instrument only. The other percussionists play a variety of instruments, and there is usually one "chief percussionist" who will assign the parts. Those of us who are not percussion players often misunderstand what it takes to "choreograph" a piece so that all the instruments are covered and no human clashes or accidental noises mar the performance. To decide whether one, two, three, four, or even five percussion players are needed to perform a work, one should first write it all out and then make that decision based on several questions:

1. Is there enough time for one player to "cover" several instruments at a time? For example, if this one player has to switch from a mallet instrument to one with wooden sticks, does he have enough time?
2. How many percussion instruments can one person play simultaneously? Could one of these players cover two or more instruments at a time?

Try to be as economical of personnel as possible, but consult often with an experienced percussion player before making a decision, remembering that the timpanist should not be counted on to take over any percussion parts other than his own, even though he may have time to do so.

General Remarks

Each instrument of the percussion ensemble will be briefly described and the method of performance presented. Then one or two passages will be provided which show its notation and basic

*For the best possible thinking on the subject, see Kurt Stone, *Music Notation in the 20th Century* (W. W. Norton, 1980), pp. 205 ff.

playing characteristics and techniques. A picture will also be provided for each instrument, and those most commonly used in the symphony orchestra will receive a little more in-depth treatment. At the end of the chapter, an extensive list of works that use a great variety of percussion instruments will be included, while an exhaustive list of books dealing with these instruments can be found in the appendix.

One word of caution before proceeding with our discussion. There are many percussion instruments, especially the mallet, pitched idiophones, which are manufactured in various sizes and therefore have different ranges. The composer should always choose the size he needs and leave the procuring of the proper instrument to the performing organization. Within reason, percussionists, being the newest members of the "orchestra club," are usually most happy to oblige the composer.

IDIOPHONES

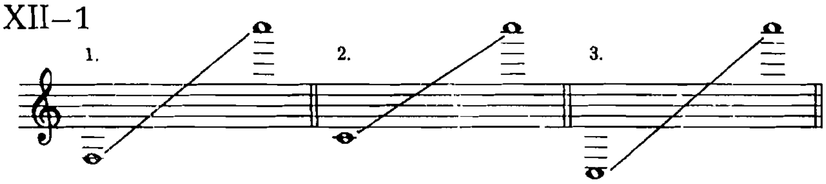
Instruments of Definite Pitch: Mallet Instruments

XYLOPHONE (XYL), *XILOFONO* (It.), *XYLOPHON* (Ger.) X[redacted]

The xylophone was the first mallet instrument to find a permanent place in the orchestra. It consists of a set of wooden bars of varying lengths arranged in the form of a piano keyboard. Up until recently, xylophones had no resonators below each of the wooden bars. Today most of them have these resonators to give added body to the very dry, hard, brittle sound of the instrument. The single notes are of a very sharp articulation and have very little sustaining power. If a note is to be sustained, the player must roll it with two mallets. The most successful passages are therefore rapid or single notes, which give a sharp edge of brilliance to similar passages played by other instruments in the orchestra at the same time. These effects are like sharp *pizzicati*. Trills, *arpeggios*, and *glissandi* are also extremely effective.

Xylophone parts are notated on a single staff in the treble clef. The instrument sounds an octave higher than written. Some composers prefer to notate it at actual pitch, but if this procedure is followed, a word to that effect should appear at the beginning of the score. There are several models of the instrument with the following ranges:

Example XII–1



The model with the range labelled number 2 is the most common and is often called the standard size. However, since the other two models exist, composers have been able to write works calling for extended ranges. If models 1 and 3 are, for some reason, unavailable, the player can compensate by transposing the notes not found on a given instrument into another octave.

MALLETS

Usually only two mallets are used by the xylophonist, one in each hand. For loud playing, hard wooden, ebonite, or hard rubber and plastic mallets are used; for soft playing, yarn mallets are used. The instrument is most brilliant and piercing in the top register, but has great power to cut through the orchestra at all registers if the right mallets are used. While the composer should specify the type of mallets by the words "hard, medium, soft" for all mallet instruments, the actual type and construction material of the mallet should be left to the choice and discretion of the performer.

Example XII–2*



MARIMBA (MRB), *MARIMBAPHON* (Ger.) M[redacted]

The marimba is a direct descendant of the xylophone. Though sounding an octave lower than the xylophone, it has the same compass of four octaves and looks very much like its ancestor. The rosewood bars, arranged keyboard fashion, are of course graduated, but thinner, longer, and wider than the xylophone's, and the resonators have always been part of its construction. The playing technique is exactly like the xylophone's, but its mellower, deeper sound has generated a different kind of music. Most marimba players use two mallets in each hand (a few even manipulate three in each hand), which makes it rather easy to roll the larger chords characteristic of the marimba repertoire. Composers have written extensively for this instrument only since 1950, but it is now coming into its own as part of the contemporary orchestra.

*If this example appeared in an actual piece, the composer would have to give the performer time to change mallets before calling for a repetition.

The size and range of the marimba is fairly standard, and there are no transposition problems. The music may be notated on one or two staffs, in either the treble or bass clef. All the mallets, except for the very hardest, that are successful on the xylophone can be used on the marimba.

Example XII–3. Range (sounds as written)



(The range of some marimbas goes down to A or even F.)

The lower register of this instrument is unique, and especially beautiful, while the farther up one goes, the closer the marimba tone resembles the xylophone.

Example XII–4



VIBRAPHONE (VIB), *VIBRAFONO* (It.), *VIBRAPHON* (Ger.)

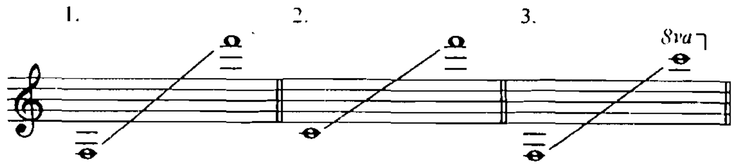
The vibraphone is essentially an American invention, vaguely related to the glockenspiel because of its metal bars. It is the only mallet instrument that uses vibrato or tremolo produced by an electrically driven series of fans located on top of the resonator tubes.

The graduated metal bars are arranged in keyboard fashion and can be played with the motor on or off. If the motor is off, there is no added vibrato, and the tone sounds very much like a struck tuning fork, pure and metallic, with a limited sustaining span. When the motor is on, the pitch vibrates and comes alive with a great deal of sustaining time. The motor's speed can be controlled so that a tone can vibrate very slowly or very quickly. There should be precise instructions regarding the motor—off, on, speed—in both the score and part.

Another device that helps sustain and then dampen the pitch is a pedal operated by the foot. When it is depressed, the tones ring; when it is released, the pitches are dampened. The composer should

indicate his intentions for the use of this pedal by writing *l.v.* (let vibrate) over a note or chord and show how long it is to be sustained. Chords of four or even six notes are possible; trills, glissandi, and fast passages are, of course, as effective on the vibraphone as on the xylophone and marimba; however, the nonrolled sustained pitches or chords give this instrument its unique sound.

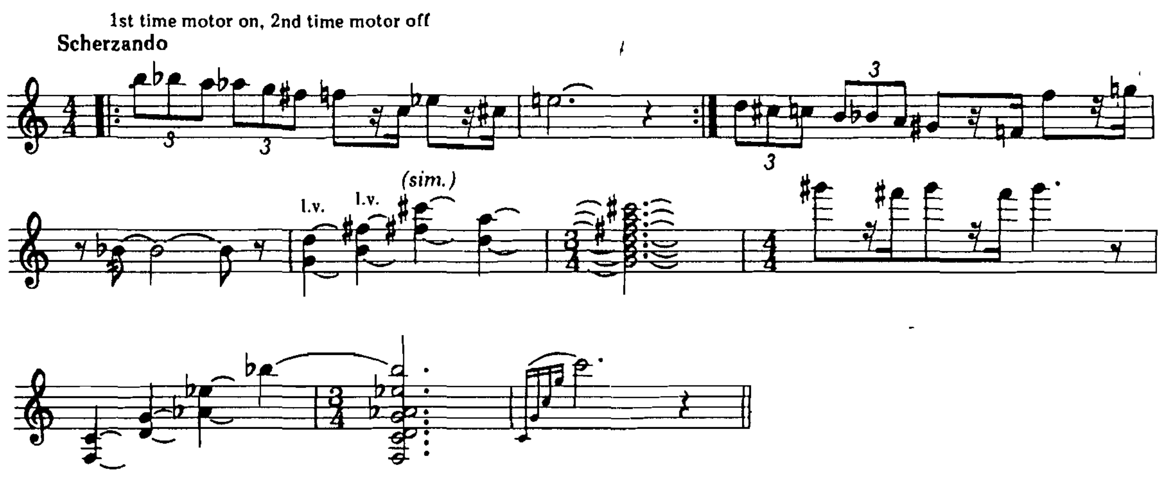
Example XII–5. Range (sounds as written)



There are three sizes of vibraphones, the first and second of which are available in most professional groups; the third size is rare.

A variety of mallets is available, including hard and medium chord mallets; plastic and wooden mallets are used rarely, but yarn mallets are common for soft passages, and wire brushes are very effective in glissando effects.

Example XII–6

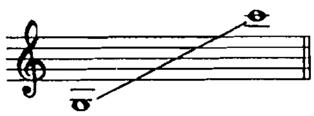


ORCHESTRA BELLS (GLSP), *CAMPANELLI* (It.), *JEU DE TIMBRES* (Fr.), *GLOCKENSPIEL* (Ger.)

The German name for this instrument is the one most commonly used. The glockenspiel consists of two rows of steel bars arranged in a keyboard. These highly tempered steel bars are mounted on a frame and attached to a portable case. It is the oldest of all the mallet percussion instruments, and we find numerous passages in nineteenth-century music.

It is a transposing instrument always sounding two octaves above the written pitch unless otherwise specified, but there are some composers (Schoenberg, for one) who insist on notating it at pitch. The glockenspiel comes in only one size.

Example XII–7. Range (sounds two octaves higher than written)



This instrument is usually played with only two mallets, although some performers use a two-mallets-per-hand technique. The glockenspiel is the only instrument for which a brass mallet should be used. This gives the loudest and most sonorous results. Other mallets, such as wooden, plastic, or hard mallets, give less of a ringing and more of a "clicking" sound, while the harder yarn mallets enable the performer to play quite softly. The glockenspiel has the power to be heard above a whole tutti orchestra, especially in its upper register, and even though it has the capacity to sustain pitches longer than the xylophone and the marimba, one can slow the process of decay and add a bit of vibrato by waving one's hand back and forth close to the bars after they are struck.

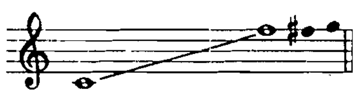
Example XII–8



CHIMES (CHM), *CAMPANE* (It.), *JEU DE CLOCHES* (Fr.), *GLOCKEN* (Ger.)

The chimes of the orchestra are often called tubular bells. They are a series of cylindrical brass tubes of varying lengths hung on a wooden or metal rack and arranged chromatically. Some come in sets of eighteen, but most American orchestral tubular bells consist of twenty bells. They sound as written.

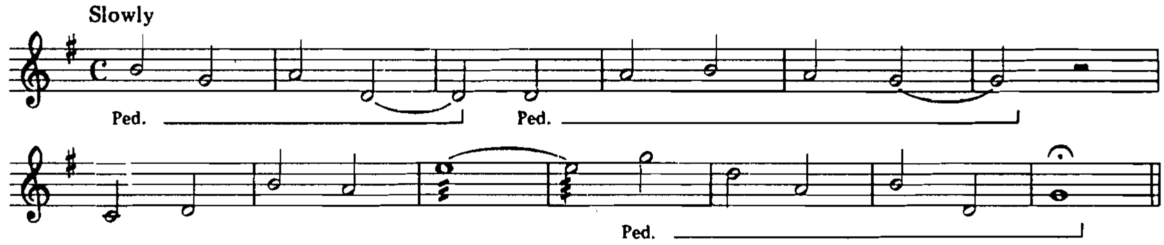
Example XII–9. Range



The sound simulates that of a church bell and has the same "out-of-tune" quality. The set has a sustaining pedal, which is operated by the right foot. Chimes are effective in soft as well as loud pas-

sages. If a soft sound is desired, the player uses a rawhide mallet and may even cover it with a cloth. For louder sounds the rawhide mallet, which actually looks more like a hammer than a mallet, as well as wooden and metal mallets are used. Faster passages convey the impression of many church bells ringing at once, especially if the sustaining pedal is depressed. The glissando is also practical but should not be overused. It is good policy not to write more than two simultaneous pitches at once, although some composers have asked for two players, each of whom plays two notes to form a four-note chord.

Example XII–10



CROTALES (CROT), *CROTALI* (It.), *ZIMBELN* (Ger.)

Crotales, sometimes referred to as "antique cymbals," are a set of small metal discs, three to five inches in diameter. They may be mounted on a wooden board shaped like a piano keyboard or held by a leather strap. A metal mallet is always used to play them, but when hand-held, they may also be struck together like cymbals. These pitched discs should not be confused with finger cymbals, which are idiophones of the indefinite pitch variety. The crotales are thicker and are tuned in a chromatic scale. As far as available pitches are concerned, two kinds of crotales exist. The lower set, which is rare, ranges from middle C to the B♮ above. The more popular set contains the pitches from third-space C to the C above the staff. All pitches sound two octaves higher than notated; in other words, the transposition resembles that of the glockenspiel. It is significant to note that crotales actually sound very similar to the glockenspiel, but have a less piercing and more defused sound when struck together. When struck by a metal mallet, the tone quality greatly resembles that of the glockenspiel.

Example XII–11. Range



A metal mallet is used for best effect, but wooden and plastic models can also be used, although they do not have as great a sus-

taining power. The practice of waving one's hand to and fro over the disc to sustain the sound is sometimes used; also, when the discs are held by their leather handles after they have been manually struck together, they can be shaken to keep the sound alive.

Example XII–12

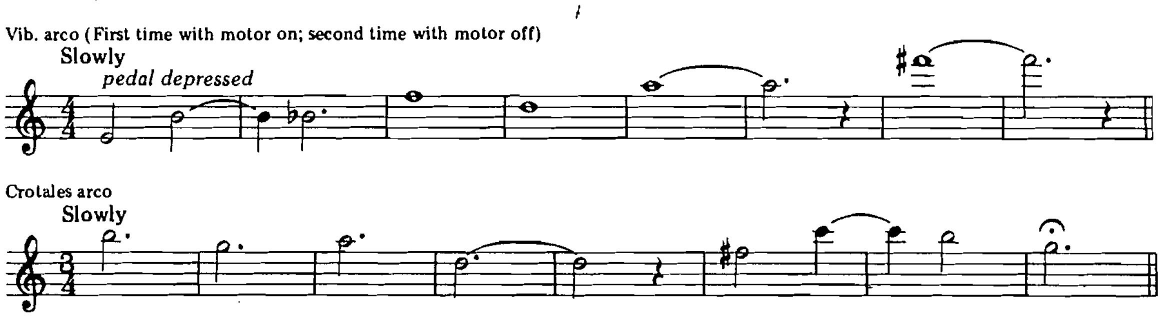


General Remarks

Before proceeding to some instruments which are important but rarer than the principal idiophones of definite pitch already discussed, here are a couple of techniques which are now employed and are very effective:

1. Use a cello or bass bow for the performance of the vibraphone (on the end of the key) and the crotales (on the edge). The vibraphone sound is especially effective with the motor on and the sustaining pedal depressed.

Example XII–13



2. While there are innumerable techniques with different mallets, the "dead sound" which can be achieved on the xylophone, marimba, and vibraphone by striking the bar and leaving the mallet on it is most interesting. This gives a nonvibrant (muffled staccato) color and is especially useful when one of these instruments is featured as soloist or is lightly accompanied.

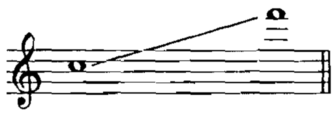
Example XII–14



MUSICAL SAW (SAW), *SEGA CANTANTE* (It.), *LAME MUSICALE (Fr.)*, *SINGENDE SÄGE* (Ger.)

For a long time this was a folk instrument made from an ordinary saw. Now it is manufactured with a finely tuned steel blade, without teeth, fixed to a wooden handle. The instrument is held between the knees; the left hand holds the extremity of the blade, while a violin bow is drawn across the edge to produce the sound. The player has no fingering to fall back on; he simply curves the blade in a certain way to obtain the pitches. There is a very pronounced vibrato to every pitch and a glissando between all the pitches. The musical saw is most suited to singing, sustained lines, and even though not as focused, the sound is very much like that of a bowed vibraphone with the motor tuned up to the highest degree of vibrato.

Example XII–15. Range (sounds as written)



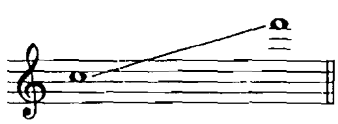
Example XII--16



FLEXATONE (FLEX), *FLESSATONO* (It.), *FLEXATON* (Ger.)

This instrument sounds very much like the musical saw, but works on a slightly different principle. A thin, triangular-shaped blade is fixed at its base into a metal frame with a handle. The unattached end of the blade is near the handle, so it can be flexed by the thumb to adjust intonation. Curved steel springs are fixed to each side of the blade with a soft ball fastened to each of the free ends. When the player shakes the instrument, the ball strikes the blade and makes the sound which is adjusted by the thumb. It is a high-pitched sound with much tremolo although single shorter sounds can be produced. It is best not to specify exact pitches, but let the instrument "fit into" the approximate ones. However, when pitches are notated, the player will attempt to come as close to them as possible.

Example XII–17. Range



Example XII–18

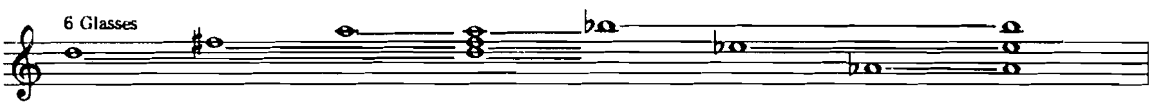


CRYSTAL GLASSES 

The musical saw, the flexatone, and crystal glasses all have a kind of "electronic" sound and have been very successfully used since World War II by such composers as Crumb, Schwantner, Mayuzumi, Kagel, and Haubenstock-Ramati. These glasses are simple crystal goblets of various sizes which produce beautifully pure pitches. They can either be struck or more commonly stroked around the rim with wetted fingers to give a long, singing tone. The practice of using glasses as musical instruments is quite old. It goes as far back as Gluck, and its close relative, the glass harmonica, an instrument made of glass bowls, was of great interest to Mozart and Beethoven.

Some composers today, instead of requiring set pitches for the glasses, simply ask for low, medium, and high, or in the case of Haubenstock-Ramati's *Les Symphonies de timbres*, four glasses—soprano, alto, tenor, and bass. In addition to glasses, porcelain bowls, glass bottles, and flasks have all been utilized.

Example XII–19



STEEL DRUMS

This is a misnomer, for a steel drum is not a drum at all, but the top portion of a large oil can—a metal head on a metal shell. It is a beautiful-sounding instrument of Caribbean origin. The top is heated until it is slightly concave; then it is incised into sections, each of which is tuned to a different pitch by hammering to the appropriate indentation. The sound is produced by striking the different pitches or sections with a soft mallet. It resembles a metallic, ringing marimba, and a number of these instruments are usually played by a group of players called a steel band. One may play the melody while the others provide the harmony. Not too many composers have as yet availed themselves of this instrument, except to invoke folk life in the Caribbean.

Example XII–20



Instruments of Indefinite Pitch: Metals

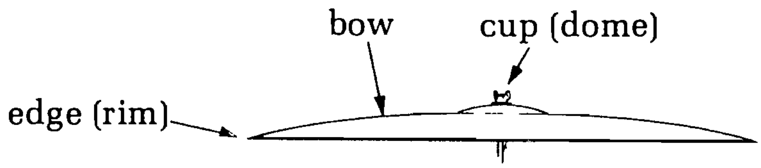
CYMBALS (CYM), *PIATTI* (It.), CYMBALES (Fr.), *BECKEN* (Ger.)

Pair of Cymbals

Suspended Cymbal or

Hi-Hat Cymbals

The cymbal, an old Turkish instrument, is a curved metal plate with a raised cup or bell in the center. It is important to know the nomenclature of the three parts of the bell in case a composer wishes to specify where a certain sound should be produced.



Cymbals are made in at least three different sizes, but if a composer asks for more, the percussionist can usually find them. The standard sizes are 10 to 14 inches, 15 to 18 inches, and 19 to 24 inches.

There are three basic playing methods:

1. Pairs of cymbals are held by leather straps fastened at the cup.

a. These may be clashed together *forte* and then held high over the player's head. If the stroke is fast, they can be clashed and immediately dampened against the player's chest. Soft strokes, of course, are very effective.

b. One cymbal may be swished across the other to give a hissing effect.

c. A roll, which is not too satisfactory, may be created by rubbing the plates together with a fast rotary motion.

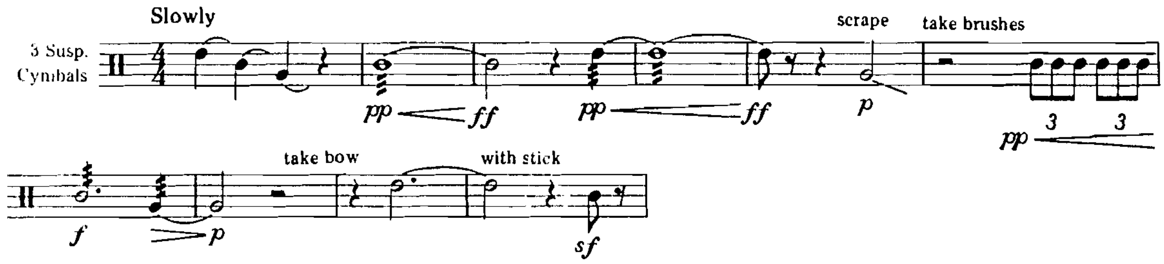
Example XII–21*



*In this example, you will find a percussion clef, which is generally used for indefinitely- or approximately-pitched instruments.

2. A cymbal may be suspended from a strap on a stand and struck with either a wooden drumstick, which gives a well-articulated stroke, or marimba yarn mallets, timpani mallets, or wire brushes for softer effects. All these sticks and mallets can be used to effect rolls on the various sizes of suspended cymbals. A triangle beater is sometimes used to strike the instrument or scrape it. This gives a truly metallic sound. There are differences in the sound of striking or rolling at the edge, the bow, or the cup, and it is best to specify the exact point of articulation if relevant. If it is not specified, the performer will usually strike and roll toward the edge.

Example XII–22



3. The Hi-Hat cymbals are not often used in the orchestra unless a composer wishes to simulate the drum set of jazz combos. This instrument consists of two cymbals facing each other, mounted on a metal rod and crashed together by a foot pedal. When crashed, it produces a dry, nonsustaining click so typical of drum set parts, or a slightly clattery, soft crash when allowed to vibrate.

Example XII–23



4. The Sizzle cymbal is the newest member of the cymbal family. It comes in a variety of sizes, and is played with the same beaters as for the suspended cymbal. The sizzle cymbal is also suspended by a strap or attached with a metal clamp to a vertical rod stand. It produces a sizzling, hissing sound when struck or rolled because it has holes drilled around its circumference, which have little metal rivets in them. When the instrument is played, these rivets bounce and produce a unique sound.

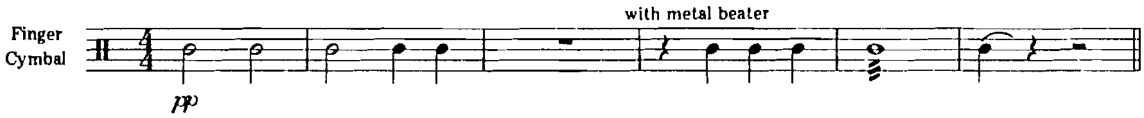
Example XII–24



FINGER CYMBALS, *CIMBALINI* (It.), CYMBALES DIGITALES (Fr.), *FINGERZIMBELN* (Ger.)

Finger cymbals consist of a pair of small metal plates about two inches in diameter, having no definite pitch. They are struck together, and while each one would of course produce a definite pitch, two struck together obscure each other's pitches and easily blend into any pitches around them. Besides being struck together to produce a high metallic sound not unlike the triangle, they can also be struck by a metal, wooden, or plastic beater. They must not be confused with the much higher-caliber crotales, which do have definite pitch. They were often used as rhythm instruments in Medieval music.

Example XII–25



TRIANGLE (TRGL), *TRIANGOLO* (It.), *TRIANGEL* (Ger.) △

The triangle is one of the oldest nonpitched percussion instruments in the orchestra. It is also most probably of Turkish origin and was favored as an instrument in early opera. The triangle became a regular member of the symphony orchestra in the nineteenth century after Beethoven (*Ninth Symphony*, Finale). It is essentially a round metal rod bent into the shape of a triangle. There are several sizes available: three basic ones—6 inches, 8 inches, and 10 inches—give a gradation of high, medium, and low. The triangle has a crystal-like, pure, high timbre that can be used as a solo sound, but in combination with other instruments it gives luminescence to a large orchestral chord. It is played with a small metal beater and can be struck or rolled. A roll or trill is produced by striking two sides of the triangle in one of the corners. Softer sonorities are really more effective than loud ones, which tend to get tiresome and obtrusive. The instrument blends beautifully, especially with strings and winds in the upper register, but also renders good contrast to bass instruments. It has a good sustaining time, and the l.v. (let vibrate) symbol is often used. One must be careful in scoring for triangle to specify exactly how long the sound should last.

Example XII–26



ANVIL (ANV) *INCUDINE* (It.), *ENCLUME* (Fr.), *AMBOSS* (Ger.)

This instrument simulates the sound of a blacksmith's anvil. It was used quite a bit in the late nineteenth century, especially by Wagner in *Das Rheingold* and also by numerous twentieth-century composers like Varèse, Bloch, and Foss. It is a large steel block struck by a metal hammer. Any like object, such as a small section of railroad track, can be substituted for it if an orchestra does not provide the manufactured anvil.

Example XII–27



COWBELLS, *CENCERRO* (It.), *SONNAILLES* (Fr.), *KUHLGLOCKEN* (Ger.) △

In Europe the real thing is frequently used, especially for such passages as in the Mahler *Sixth Symphony* (first movement, mm. 198–216). In this country cowbells are manufactured in various sizes from about three to ten inches in a somewhat triangular form. They are usually bronze-plated. The pitch of the low, medium, and high sizes does not vary greatly, and they are used in Latin American dance bands as much if not more than in symphony orchestras. They are struck with a snare drumstick and give a clanging sound.

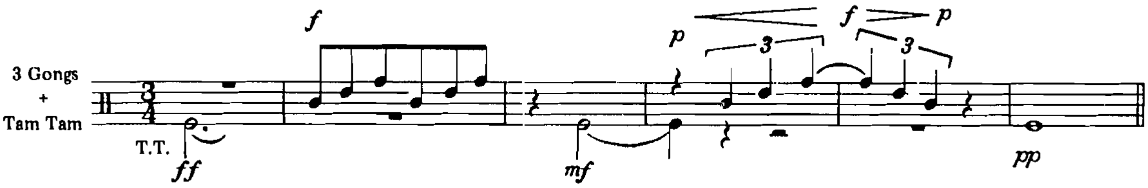
Example XII–28



TAM-TAM (TAM. T.) AND OTHER GONGS ⊙

The tam-tam is usually considered the largest gong, but this is a dangerous assumption for most gongs are pitch-oriented. Yet it does look like a gong made of a heavy metal, struck with a large device called a tam-tam beater. Although there has been much discussion about "exact" tuning of gongs, it must be said that even the best ear will have problems identifying the fundamental pitch of most of them. Nevertheless, a differentiation should be made between the non-pitched gong family, of which the tam-tam is the largest member, and the authentic oriental gongs, which do have specific pitches. While the tam-tam is struck with an especially large beater, the other gongs are usually played with a timpani mallet or a slightly thicker beater.

Example XII–29



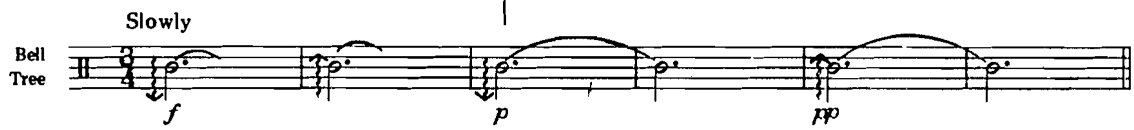
OTHER AVAILABLE INSTRUMENTS

Example XII–30. Sleighbells —ooo or (ooo)



Manner of performance: Sleighbells are held in one or both hands and shaken.

Example XII–31. Bell Tree



Manner of performance: A metal beater is used to stroke the small bells on the tree in an upward or downward motion, as specified.

Example XII–32. Brake Drum. (These are automobile brakedrums, and come in various sizes.)



Manner of performance: Similar to any drum using drum sticks or brushes.

Example XII–33. Thunder Sheet. This is a large sheet of metal suspended on a stand.



Manner of performance: The thunder sheet may be struck with a beater or shaken by hand.

WIND CHIMES (W.CH.)

There are three kinds of wind chimes:

1. Bamboo Wind Chimes
2. Glass Wind Chimes
3. Metal Wind Chimes

All wind chimes are based on the same principle: the suspending of various sizes of bamboo sticks, pieces of glass, wood, or metal, similar to a mobile. The chimes are struck by the hand and jangled until they are stopped by the hand. Bamboo and wooden chimes can also be stroked by a small wooden stick or grasped together suddenly to emit a dry sudden sound similar to "chock." The sound of the wooden and bamboo chimes is loud when they are "chocked" together, but otherwise they emit a small, hollow, brittle rustling. The wooden chimes are much higher pitched than those of bamboo, while the glass chimes emit a very high, delicate, soft jingling, and the metal chimes, a bit more blatant yet not very loud sound. Here is a passage demonstrating the sound of all the different wind chimes:

Example XII–34

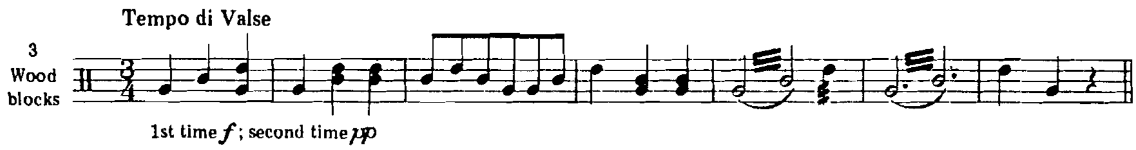


Instruments of Indefinite Pitch: Wooden

WOODBLOCKS (W.BL.), *BLOCCO DE LEGNO CINESE* (It.), *BLOC DE BOIS* (Fr.), *HOLZBLOCK* (Ger.)

Woodblocks come in sets of three to five sizes. They are rectangular pieces of hard wood, and even though they are considered nonpitched instruments, the different size blocks produce a variety of nondefinite pitches in a spectrum from low (the largest block) to high (the smallest block). Drumsticks, marimba, wooden, plastic, or rubber mallets are all effective beaters. The sound is incisive, penetrating, and very dry, and these blocks are valuable and exciting playing a single *secco* sound, rolls, or fast passages for which they are especially well suited. If only one woodblock is used, it may be held in one hand and struck with a mallet held in the other hand. Otherwise, when several woodblocks are called for, they are either mounted or placed in a set on a table or a stand.

Example XII–35



TEMPLE BLOCKS (T.BL.), *BLOCCO DE LEGNO* (It.), *TEMPLE-BLOC* (Fr.), *TEMPEL-BLOCK* (Ger.)

Temple blocks are a graduated series of five clam-shaped wooden blocks mounted on a stand. They are usually lacquered red and are of Far Eastern origin. The technique of playing and the beaters are the same as for the wood blocks, but the sound is quite a bit more resonant, more mellow, and more hollow. The music for temple blocks is also similar to that for wood blocks with special emphasis on *secco* single strokes, rolls, and fast passages.

Example XII–36



CLAVES

This is an instrument of Latin American origin consisting of two round pieces of hard wood, each approximately one inch in diameter and approximately six inches long. One of the claves is lightly cradled in one hand on the fingers of a loose fist and struck incisively by the other clave held in the other hand. The cupped hand acts as a resonator. The sound is like striking the highest wood block very hard, but it has slightly more resonance and "ping." It usually plays ostinati (the "key" rhythm) in Latin American rhumbas, congas, and sambas, but it has also been used in orchestral music to reinforce *secco* chords or as an alternative to wood or temple block sounds.

Example XII–37



CASTANETS (CAST)

Castanets are probably of Mediterranean origin and have been in existence for hundreds of years. There are even concertos for castanets and strings by some Spanish and Italian composers of the seventeenth and eighteenth centuries. Often they are used in the orchestra to suggest Spain or Spanish subjects, and a famous passage for castanets—the "Habañera" from Bizet's *Carmen*—comes to mind immediately. But today, composers use them to emphasize rhythms and reinforce sharp attacks as well.

The instrument is made of a pair of small, hardwood, spoon-shaped shells which are struck together. There are three kinds of orchestra castanets:

1. Hand castanets: usually two pairs, one held in each hand. These require considerable skill to play and are rarely found in the orchestra.
2. Paddle castanets: a pair of castanets mounted, one on each side of a wooden paddle. These are easy to play and can have a very loud dynamic.
3. Concert castanets are mounted on a board. The lower castanet is stationary and connected to the upper one by a spring. The upper castanet is clicked against the lower with a finger or a drumstick. This castanet machine is the newest of the three ways of performing on this instrument, and the most commonly used in the orchestra.

Example XII–38



SAND BLOCK [SANDPAPER BLOCK] (S.BL.)

This always sounds like a "soft shoe" dance and consists of two small blocks covered with sandpaper on the bottom side. The sandpaper surfaces are brought together and rubbed against each other. There can be simple, coarse, short strokes, rhythmic passages, or rolls. If one wishes an especially harsh sound, one should specify that the sandpaper be especially coarse. If the opposite effect is desired, fine or medium sandpaper should be requested.

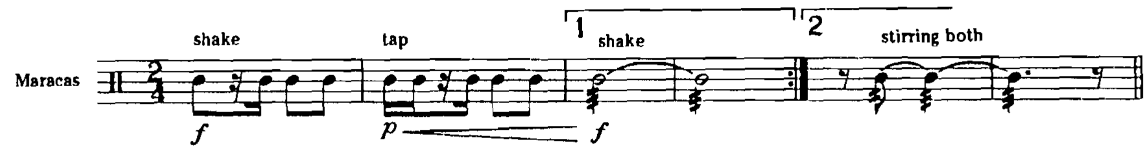
Example XII–39



MARACAS (MRCS)

The maracas are another Latin American instrument and usually come in pairs, although if they are played in a non–South American context, one will often suffice. The instrument is made of a gourd or wood or plastic shell filled with pebbles or seeds. In Latin American dances they usually play ostinato patterns, but in orchestral situations the sizzle of the maraca has always had a special charm. It may be shaken or slowly twirled (stirred). This latter is very effective, especially written as a *pianissimo* roll (solo). Also, simply tapping the maraca with one hand to get a short-note effect is possible.

Example XII–40



JAWBONE

(The new manufactured instrument is called the vibraslap) This is also a Latin instrument related to the maracas, since it also rattles. It looks like the jawbone of a donkey. The player holds it in one hand and strikes it toward the top with the fist of his other hand, making "loose teeth" rattle. Usually one writes only single strokes for this instrument, since each will buzz for a time commensurate with the force of the blow.

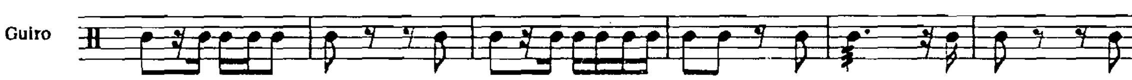
Example XII–41



GUIRO

This is a large gourd in the shape of a bottle with a serrated side on which one scrapes back and forth with a wooden stick or scraper. Naturally it is used a great deal in Latin American dance bands, but many composers have used it instead of the European ratchet or rattle. Single strokes as well as rolls are possible.

Example XII–42



RATCHET

This instrument simulates a child's ratchet, and it is constructed in a similar manner: a hard tongue of wood or metal is held in a frame so that when the "wheel of teeth" is rotated against it by a handle, these teeth catch and make a loud clacking sonority. The instrument is best used in a loud dynamic and for rolls, since single strokes are risky and would work much better on the guiro.

Example XII–43



WHIP [SLAPSTICK]

In Europe this instrument is usually called a whip, while in America we call it slapstick. Its construction is much closer to the latter term, for it is made up of two strips of thin hard wood tied together into a paddle held by a string. It can produce only a single very hard stroke when the two pieces of wood are clapped together. The use of this instrument is usually to emphasize a sforzando effect.

Example XII–44



LOG DRUM AND SLIT DRUM

These are Mexican-Indian and African instruments respectively. The log drum is simply a hollowed-out log plugged up at each end. A slit is made along the entire surface on one side; then two "tongues" are cut in, dividing the wood into two different lengths producing two different "pitches" when the wood is struck on the two different sides of the opening. Several sizes of the log drum can be required, and they will produce pitches according to their size and thickness. One can even specify well-defined pitches.

Slit drums are similar in construction, but look a bit more sophisticated. The sound is produced by hard marimba mallets striking the drums on either side of the slits. The intervallic relationships, depending on the thickness of the drum, can be a third or most often a perfect fourth or even fifth. They can easily take the place of wood or temple blocks but have a darker sound.

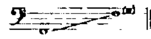
Example XII–45



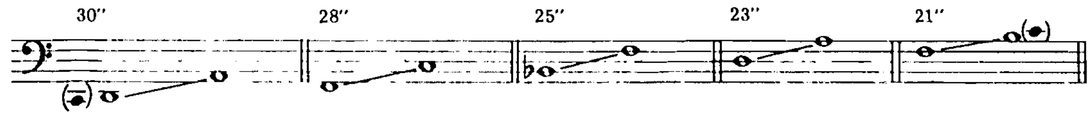
MEMBRANOPHONES

Instruments of Definite Pitch

TIMPANI (TIMP), *TIMBALES* (Fr.), *PAUKEN* (Ger.)

The oldest regular percussion members of the symphony orchestra are the timpani or kettle drums. Until this century the total range of the timpani was  . Now, however, we have a series of interlocking drums that give us a much larger range. Four sizes of timpani are commonly available in all orchestras: 30-inch, 28-inch, 25-inch, and 23-inch. If a piccolo timpani, 21 inches in diameter, is not available, a tuned tom-tom or roto tom may be used in its place.

Example XII–46. Ranges



The tuning of the timpani until earlier in this century was accomplished by tightening or loosening the calfskin head membrane of the drum by means of the screws placed around the perimeter. Much time was needed to change the tuning of the instrument; therefore, only limited functions were assigned to the timpani. Today the drums are fully mechanical, with a foot pedal on each drum to change pitches very quickly and easily. This innovation has greatly enhanced the function and potential of the instrument.

During the Classical period only two drums were commonly used in the orchestra, usually 28-inch and 25-inch. The role of the timpani was to strengthen the tonic and dominant bass notes and participate in strong tutti passages, especially in consummating climactic cadence points. Occasionally they were called for in quiet passages to create a special atmosphere, such as in the Haydn *Drum-roll Symphony*. Not until Beethoven's time did the timpani become a solo instrument. The standard coupling with the trumpets was still very prevalent in the symphonic scores of Haydn and Mozart, so that when Beethoven, in his last two symphonies, had the two timpani tuned in an octave F, and in the sardonic scherzo of the *Ninth* used solo timpani, it was quite a shocking innovation. Berlioz, who even used two or more sets of drums and two or more players in some

works, was the first to develop timpani writing which expanded to three then four or more drums in our own time.

Usually, special timpani mallets are used. These come in hard, medium, and soft varieties. Other mallets, such as wooden drumsticks, or simply the handles of the timpani mallets, etc., can be used for special effects.

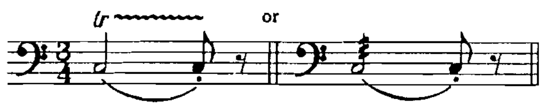
The timpani are extremely versatile. They can play single notes, rolls, and, with our mechanical aids, can easily do glissandi. The single notes can be slow or fast, and the dynamic range of the timpani is exceedingly great.

The timpani tone is affected not only by the kind of mallet used, but also by the place on the head where the mallet strikes the drum. Usually, the player strikes the head about six inches in from the rim. A beautiful *pianissimo* can be achieved by playing even closer to the rim. A very thick, thudlike sound which obscures the pitch somewhat is obtained by hitting the center of the head.

Muting is made possible by placing a cloth to cover part or all of the head, and today some composers have asked the timpanists to place cymbals, tambourines, maracas, and other percussion instruments on the head, letting them ring sympathetically when the drum is struck. The side of the drum, the bowl in other words, is sometimes used as an unpitched percussion instrument played with wooden sticks, as is the rim.

The timpani part must be carefully prepared to show dynamics and the exact duration of each note; for instance, where a roll or trill is to end, how long a note may ring, etc. A roll may be notated in one of two ways:

Example XII–47



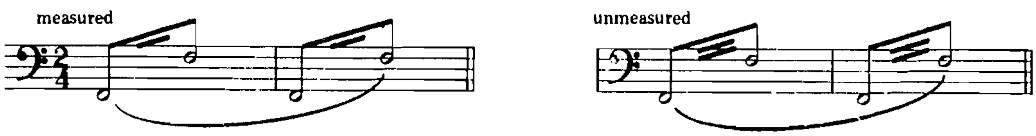
A longer roll should be notated:

Example XII–48



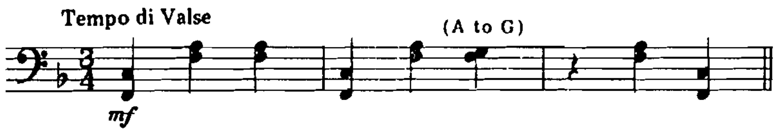
A tremolo on two different drums should be notated to indicate whether it is measured or unmeasured.

Example XII–49



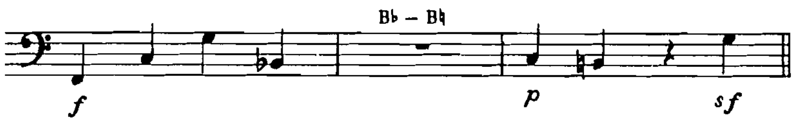
Two or more notes can be played at the same time. Here is a passage which is possible on a four-drum set:

Example XII–50



It is advisable to mark changes in tuning, especially if it must be accomplished rather quickly. This is done in the following manner:

Example XII–51

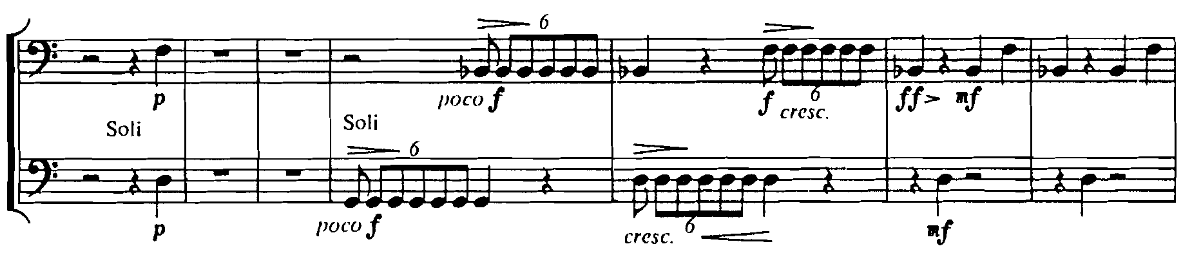


Here are some examples of timpani usage from the orchestral literature:

Example XII–52. Beethoven, *Symphony No. 9*, second movement, mm. 261–73



Example XII–53. Berlioz, *Symphonie fantastique*, fourth movement, mm. 83–90



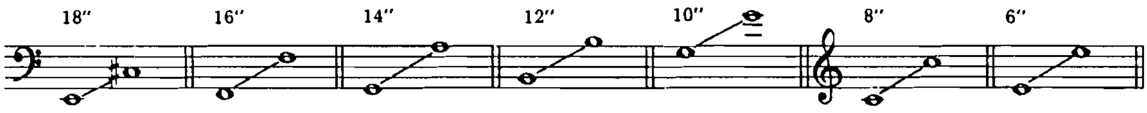
Example XII–54. Bloch, *Schelomo*, mm. 170–71



ROTO TOMS (R.TOM), *ROTO-TOM-TOM* (It.), *TOM-TOM-SPIEL* (Ger.)

An American manufacturer (Remo) recently developed a series of roto toms (tom-toms) that are tuned by manual turns of the shell on a frame. They come in seven sizes and have a pitch compass as follows:

Example XII–55. Ranges

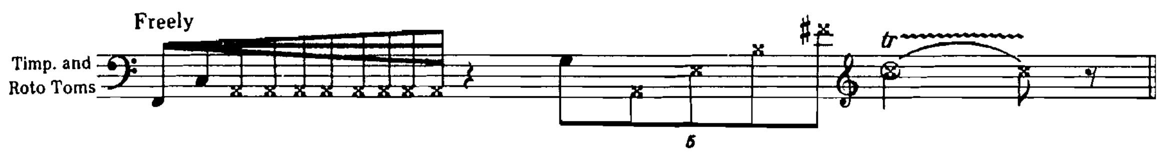


These drums are now made with a timpani-style bowl resonator, and they sound very much like that instrument except for the fact that their pitch is clearer and more articulate. The potential range of the timpani is greatly extended by use of the roto tom, which uses the same beaters and has a compatible sound. When timpani and roto toms are used in combination, it is helpful if a different-shape notehead is used for each. Roto toms blend beautifully with all kinds of instruments and create excellent contrast for the repetition of timpani passages at higher pitches. It is also possible to play a slow melody on a drum. The following notation is suggested:

Timpani: regular notation

Roto toms: 

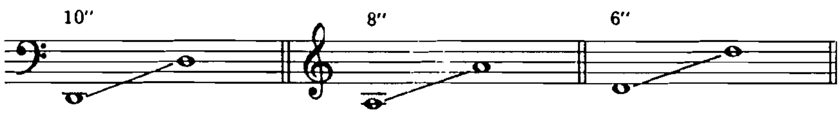
Example XII–56



All timpani techniques can be applied to roto toms.

Regular roto toms are now obsolete and are replaced by the drums described above; yet many organizations still have them. The regular roto toms come in three sizes: 10-inch, 8-inch, and 6-inch, with the following ranges:

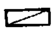
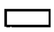
Example XII–57. Ranges



These are tuned like the Remo toms, by rotating the head clockwise to tighten, counterclockwise to relax. They are simply plastic heads stretched over a metal rim fastened to a base. Their sound is

much dryer and of much less sustaining quality than the timpani or the Remo toms. All kinds of wooden sticks, wood, plastic, or rubber mallets, and even chord mallets are affective.

Instruments of Indefinite Pitch

SNARE DRUM (S. DR.), *TAMBURO PICCOLO* (It.), *CAISSE CLAIRE* (Fr.), *KLEINE TROMMEL* (Ger.)  with snares;  without snares

The snare or side drum is another instrument that has long been a member of the symphony orchestra and even longer in the opera orchestra. The instrument has two heads: the top and playing head is called *batter*, while the bottom one, which has the snares (cat gut, wire, or nylon) stretched across it, is referred to as *snare*. The snare drum has a switch on the side which, if loosened, shuts off the snares and makes the instrument sound like a tom-tom. With the snares on, the instrument has a crisp, sharp sound and is excellent for playing concise rhythmic patterns. There are four basic strokes besides the single left-right stroke:

a. flam  b. drag  c. four-stroke ruff 

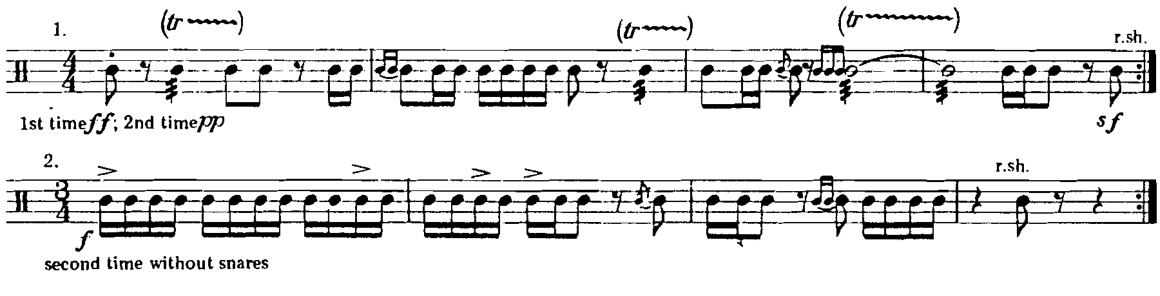
d. roll  or 

In the first three strokes the grace notes precede the accented note unless otherwise specified.

Besides the "snares off" color change, one may place a cloth on the batter head and mute the instrument. One should designate this effect as "cover head." Another effect quite frequently used is the rim shot, a very sharp sound produced by placing one stick on the head and rim and then hitting it in the middle with the other stick. The instruction to the player should read: r.sh.

Wooden sticks are the normal beaters for the snare drum, although wire brushes are used for soft effects, especially in jazz. Here are some examples of snare drum passages:

Example XII–58



Notation of a trill is possible, but the  is preferred.

TENOR DRUM (T.DR.), *CASSA RULLANTE* (It.), *CAISSE ROULANTE* (Fr.), *WIRBELTROMMEL* (Ger.) □

The tenor drum is found quite frequently in bands and orchestras. It has a deep and resonant sound and shares the basic snare-drum techniques, although it has no snares. Wooden sticks serve as beaters, though timpani mallets and marimba mallets are also effective.

Example XII–59



FIELD DRUM (F.DR.)

This is a deeper shell snare drum (with snares) than the tenor drum, which has the same circumference but no snares. The field drum, seldom used in orchestras, has a darker, less crisp sound than the snare drum and is played with large snare drumsticks. The same techniques apply to both, however.

Example XII–60



BASS DRUM (B.DR.), *GRAN CASSA* (It.), GROSSE CAISSE (Fr.), *GROSSE TROMMEL* (Ger.)

"If you hit the bass drum hard, it does not make any difference what the chord is above it; if you roll *fortissimo* on the bass drum, the rest of the orchestra can quit playing." This is what Walter Piston once said to his orchestration class, and it accurately describes the tremendous power of the instrument and the care one must take in using it. Its response is a bit slower than the smaller drums, but it is very effective in relatively slow-moving repeated notes as well as *secco* fast isolated strokes.

The instrument has two heads, both of which can be used for playing if the instrument is standing upright on its side (⊂⊃). The bass drum can also be laid flat (⊖). It is effective in soft passages and adds tremendous weight to the percussion section in loud dynamic situations. One should remember Piston's admonition and not over-

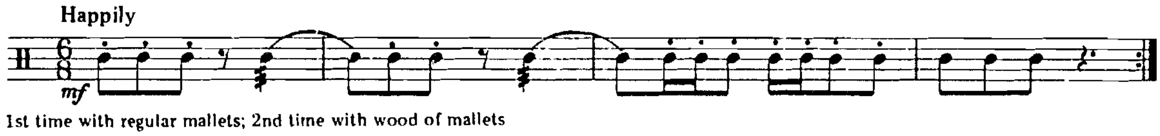
use it. It may be used to close off a short-note percussion passage or to begin such a gesture with a single stroke (Copland, *Third Symphony*, second movement, beginning and ending). It can also simulate distant thunder or evoke a feeling of impending doom with a *pianissimo* roll. In older symphonic literature it was often used to recall war or belligerent hostility.

Usually, a mallet resembling a timpani mallet but a bit larger, softer, and with a little more felt on the head, is provided for the bass drum. Wooden sticks are also used for strokes and rolls.

Example XII–61



Example XII–62



TOM-TOMS (T.T.) □

These are the membranophones which occupy that grey area between definite and indefinite pitch, for the tom-toms can be tuned to approximate pitches if desired. They come in two pairs of four varied-size drums. The pitch may be divided like four voices—soprano, tenor, alto, bass—and tom-toms may be notated on the four spaces of the staff. The drums themselves resemble smaller tenor drums with no snares; many have only one head. There is another set available, called two-headed tom-toms, which is even more like the tenor drum. These are most often used in jazz bands, but if the composer so specifies, they can be available in a symphony orchestra. The single-headed tom-toms are crisper and more articulate, while the double-headed ones have greater sustaining power and are deeper and more somber in sound.

Yarn, chord mallets, or regular snare drumsticks are the most common beaters used, and the technique is similar to the drum technique. Much of the music also incorporates the gestures otherwise written for wood blocks and temple blocks, with which tom-toms often carry on a dialogue in the orchestra. By the way, the two kinds of tom-toms, one-headed and two-headed, are interchangeable, and most listeners cannot tell the difference between them.

Example XII–63



TIMBALES (TIMB), *TIMPANETTI* (It.), *TIMBALES CUBAINES* (Fr.), *KUBA-PAUKEN* (Ger.)

The timbales come in pairs fastened to a metal stand similar to the one-headed tom-toms. As a matter of fact, these drums are too often mistaken for tom-toms. However, they are of Latin American origin and come in only two sizes: 13 inches and 14 inches in diameter, one a high drum and the other low. Like the tom-toms, they are one-headed drums but have a metal shell of about snare-drum depth, and therefore a more metallic and piercing sound. There are several ways of playing them:

a. with timbale sticks, which are wooden dowels, thinner and lighter than snare drumsticks;
b. with marimba mallets;
c. with one's hands;
d. with any kind of mallet or stick on the rim, in the center of the drum, or in a rim shot.

Example XII–64



BONGOS

The bongos always come in attached pairs and are single-headed drums of Latin American origin. There are primitive bongos which are simply skin over shell and cannot be changed in tuning. They are indefinitely pitched—low, high, higher, and highest. The professional bongos have a tightening apparatus on the rim. Usually they are adjusted so that they are a perfect fourth or fifth apart. Most musical organizations have only one set of bongos, but several sizes are manufactured, and a composer is safe writing for two sets, which means four drums of unequal tuning.

Bongos are traditionally held between the knees and played by

hand. However, they can be mounted like timbales and played by hand or with snare drumsticks, any kind of mallet, and even very softly with brushes. There is a very special technique for bongo playing, and the professional bongo player has developed finger muscles and callouses on his hands so that he can perform extraordinary feats on the instruments. The ordinary percussion player cannot be expected to be proficient in that type of specialized playing, but typical tom-tom type music can be performed without a problem.

Example XII–65



CONGA DRUM (C.DR.), *TUMBA* (It.)

This is the Latin American bass drum instrument quite often used today in the symphony orhcestra. It stands about thirty inches high, and its single head is about eleven inches in diameter. The typical conga drum has a reverse hourglass figure. The drum is best played with the hands, but all types of mallets may be used. By striking the head near the rim, one can get a higher pitch than by hitting the center of the head; therefore, one should specify what kind of "pitch" one desires. Usually it is notated on two lines or in two spaces to indicate the pitch difference.

Example XII–66



TAMBOURINE (TAMB), *TAMBURO BASCO* (It.), *TAMBOUR DE BASQUE* (Fr.), *TAMBURIN* (Ger.)

The tambourine, as in the case of so many of these percussion instruments, has ancient origins, and we find mention of it in the Bible. It evokes thoughts of Spain, but is used for all kinds of music today. The instrument is basically a shallow drum consisting of a single-head skin fastened over a wooden hoop. Around the frame there are several slots with pairs of small disc cymbals, which jingle when the instrument is struck or shaken. Since there are several sizes of tamourines, one should specify whether one wishes a large 15-inch, medium 10-inch, or small 6-inch model. If there is no par-

ticular specification, the player will usually use the 10-inch instrument.

There are several playing techniques:

a. striking the instrument with one's knuckles;
b. playing it softly with one's fingers;
c. shaking it (notated like a roll), usually used for loud rolls;
d. a thumb roll excellent for soft rolls (must be spelled out in the part);
e. all kinds of sticks and mallets, if the instrument is placed on a stand or chair;
f. placed on other percussion instruments like timpani, snare drums, bass drums, and played with a mallet.

Example XII–67



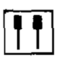
BEATERS

Since in our discussion of the percussion instruments the graphic notation has been given whenever possible, it is most important to give the symbols for all beaters. These symbols are now almost universally accepted. and even if the instruments are included on a score, those symbols should be used throughout and explained in a guide to the notation at the beginning of the score and parts. It will save a great deal of time and clarify the intentions of the composer or orchestrator.

 Hard sticks (wood or plastic heads)

 Medium sticks (rubber heads)

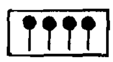
 Soft sticks (lambswool or soft felt heads)

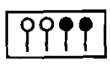
 Metal sticks

 Wire brushes

 Bass drum stick

 Heavy beater (for tamtam etc.)

 Two hard sticks in each hand

 Two soft sticks (l.h.) and two hard sticks (r.h.)

 Two soft sticks in each hand

There are of course many other percussion instruments, but the ones discussed in this chapter are by far the most frequently used in the modern symphony orchestra, band, or wind ensemble. Many instruments which were omitted can be found in the books men-

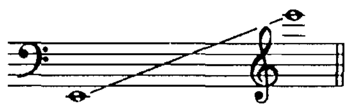
tioned in the Appendix. Instruments like the Indian and Arabian tablas need more specialized study than this discussion can provide, so it was left to the composer or orchestrator to find more authentic sources for these rare and exotic instruments.

CHORDOPHONES

CIMBALOM

The cimbalom is the most highly developed of the ancient dulcimers, a version of which is prominently featured in the folk music of Appalachia. However, the Hungarians developed their dulcimer (cimbalom) early in this century for use in the symphony orchestra. The cimbalom is usually trapezoid-shaped; it is similar to a piano without the keyboard, having a multiple of strings for each pitch. The instrument is laid flat and struck on its metal strings in various ways with a leather or sometimes wooden mallet. The modern cimbalom is equipped with a foot-operated damper pedal and has a compass of four octaves with all chromatic tones.

Example XII–68. Range



The instrument is used beautifully by Bartók, Kodály, and Stravinsky, in rapid and florid passages. Like the marimba, the notes to be sustained are usually rolled.

Example XII–69. Kodály, *Háry János*, fifth movement, mm. 87–93



The piano, harpsichord, harmonium, and organ will be discussed in the following chapter, despite the fact that the piano as well as the harpsichord are chordophones and are often designated as percussion instruments in a symphony orchestra.

AEROPHONES

WHISTLES

Whistles of all kinds are used for various effects, especially in late twentieth-century scores. The kind of whistle required should be carefully indicated in the score: bird whistle, police whistle, slide whistle, tin whistle, train whistle, *etc.* If no specific pitches are desired, there should at least be an explanation of exactly what the whistle is to do.

Tunes should be exactly notated. In *Billy the Kid,* Copland asks for a tin whistle to play this tune:

Example XII–70. Copland, *Billy the Kid,* "Street in a Frontier Town," mm. 1–4



SIRENS

Many twentieth-century composers have used sirens, especially Varèse, Antheil, and Hindemith, to paint a realistic picture of modern society. If one wishes to use sirens, the volume and the type of siren, such as high, shrill, ringing, etc., should be designated. The notation is not standardized, but could be on one line, showing the duration and dynamic.

MOTOR HORNS

Motor horns of all kinds have been used, especially in early twentieth-century pieces (Gershwin, *An American in Paris*) in which urban life was to be evoked. All these effects must be used very carefully, for most of them have by now become clichés.

WIND MACHINE

The wind machine is made of a large cylindrical wood frame covered with silk that is rotated by turning a handle. The silk is stroked by thin pieces of wood, creating a kind of swirling and whistling sound as the velocity of the revolutions accelerate. The result is a very realistic wind effect. The successful use of a wind machine in Richard Strauss's *Alpine Symphony* and *Don Quixote* prompted other composers to experiment with it as well.

Additional Timpani passages:

Elgar, *Enigma Variations*, Presto
Mahler, *Symphony No. 1*, third movement
Harris, *Third Symphony*, mm. 421–25
Bernstein, *Jeremiah Symphony*, second movement, mm. 288–301
Hanson, *Symphony No. 2*
Shostakovich, *Symphony No. 1*, fourth movement, at [35]
Wagner, *Siegfried*, Funeral Music, opening
Sibelius, *First Symphony*, third movement, m. 4
Bartók, *Music for String Instruments, Percussion, and Celesta*

Additional percussion combination passages:

Wagner, *Die Meistersinger*, Act III, Scene 5, Waltz (glockenspiel, flute, oboe)
Saint-Saëns, *Danse macabre* (xylophone)
Stravinsky, *Petrushka*, p. 56 (xylophone and piano)
Mahler, *Symphony No. 6*, first movement (xylophone)
Ravel, *Alborado del gracioso*, p. 14 (large combination)
Jolivet, *Symphony No. 2*, first movement from [34] to end (large combination)
Wagner, *Das Rheingold*, Scene II (large combination)
Varèse, *Offrandes* (harp plus large percussion section)
Messiaen, *Trois petites liturgies*, second movement (large percussion section plus piano and ondes martenot)
Colgrass, *As Quiet As*, third movement (large section used pianissimo)
Wagner, *Parsifal*, final scene (chimes)
Puccini, *Tosca*, Acts I and II (chimes)
Chabrier, *España* (large percussion section)

13

Keyboard Instruments

The piano is certainly one of the most popular and versatile instruments in use today. Yet even though it has been available (in some form or another) since the late eighteenth century, it did not become an orchestral instrument until the latter part of the nineteenth century and has only been extensively used in the twentieth. As a solo instrument, the piano has probably been featured in more concertos than any other instrument and during the entire nineteenth century, when the harpsichord was virtually forgotten, the piano was often used as a continuo instrument for the performance of Baroque works. (Historical documentation shows us, however, that the piano too was abandoned for this purpose when conductors realized figured basses with woodwind instruments. A "good" example of this are the arrangements of Vivaldi concerti by the Italian composer Siloti, which were so popular during the first decades of our century.)

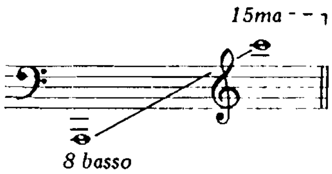
Today, the piano, harpsichord, celesta, harmonium, and the organ have been joined by an entire family of electronic keyboard instruments that may be used in solo passages as well as integrated into the orchestral texture. For more information about this volatile and ever-expanding group of instruments, the reader is referred to a list of books and journals which may be found in Appendix B.

PIANO

Pianoforte (It.), *Klavier* (Ger.)



Example XIII–1. Range



The piano is perhaps the best known of all musical instruments, but its inclusion in the ranks of the symphony orchestra is a rather recent phenomenon. One must conclude from studying the usage of the piano as an orchestral instrument that it was a French innovation, since it is in the scores of Saint-Saëns, D'Indy, Debussy, and Stravinsky that it first appears.

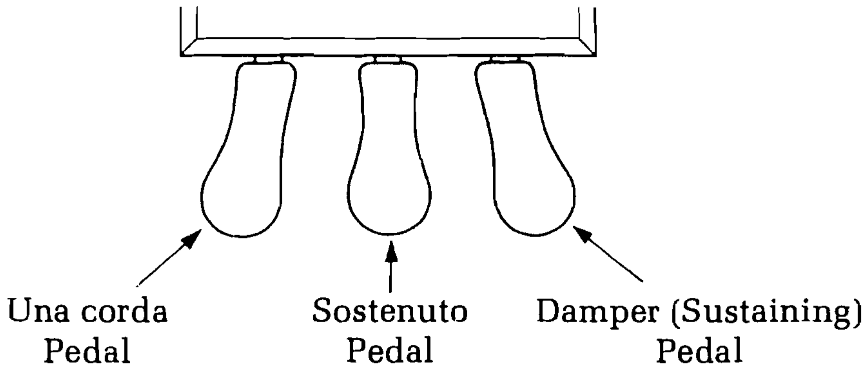
In relationship to the orchestra, the piano may be viewed in the following capacities:

1. as the solo instrument in a piano concerto;

2. as the executant of an obligato in orchestral works, such as Bloch's *Concerto Grosso No. 1*, D'Indy's *Symphony on a French Mountain Air*, De Falla's *Nights in the Gardens of Spain*, Stravinsky's *Petrushka*, and others (Saint-Saëns's *Carnival of the Animals* uses two pianos obligato);

3. as a purely orchestral instrument, in such works as Debussy's *Printemps*, Martin's *Symphony No. 4*, Shostakovich's *Symphony No. 1*, Copland's *Symphony No. 3*, Prokofiev's *Symphony No. 5*, Sessions's *Symphony No. 2*, Colgrass's *As Quiet As*, and many others.

The piano is usually used to double a passage or emphasize a *secco* chord or note, with its extreme registers employed more often than those at the middle of the instrument. Occasional solos are assigned to the piano for contrast, and since the instrument is usually placed somewhere in back of the orchestra, these featured passages do not convey the impression of a solo in a particular work. Contemporary composers often use it as a percussion instrument. The piano is a substitute for or a contrast to the xylophone, marimba, or vibraphone and at the bottom of its range can also reinforce the timpani or bass drum. Combination doublings with strings, woodwinds, and brass are of course also successful. There are instances where the piano is used instead of a harp, playing arpeggios in *fortissimo* passages where the latter would be completely obliterated. In this connection one should remark that, of necessity, many nonprofessional and school orchestras use a piano to minimize the "holes" that exist in the organization, since there may be no oboe, bassoon, or viola. This is something that is purely pragmatic and will be discussed in a much later chapter.



The Three Piano Pedals

The most frequently used of the three is the damper pedal which lifts all the dampers and permits the strings to vibrate even after the key has been released. The *una corde* pedal is the next most important. *Una corde* means one string, and describes the action of this pedal on a grand piano: when depressed, it moves the hammers into a position where they can strike only one or in some cases two of the three strings of one pitch. On an upright piano, this pedal moves the hammers closer to the string. Both actions are designed to soften the tone of the instrument. The center pedal is the most problematical. It is correctly called the sostenuto pedal and sustains only those

pitches that are depressed at the same time the pedal is put into action. It is most useful for pedal points, for one can depress a pitch and at the same time depress the sostenuto pedal, thereby sustaining that pitch while playing other passages over it. Other pedals may be used at will without affecting the pedal-point note. Unfortunately, many European pianos and a great majority of uprights do not have this pedal, so it is a risk to write for it. Nevertheless, orchestral pianos are usually nine-foot grands and would most certainly have all three pedals.

Often, because of the rather novel nature of the middle pedal and its infrequent use, the right pedal has been called sostenuto; however, that is not correct; the names given above are the ones to be used. However, in English, if one refers to the sustaining pedal, one usually means the right or damper pedal, simply describing its piano in various ways:

1. Prepared piano is indicated, meaning that various objects are to be placed either on top of the strings or wedged between them.
2. The piano strings are struck with various beaters or brushes to sound like mallet percussion or dulcimers.
3. The piano strings are plucked either *secco* or allowed to vibrate.
4. Roaring bass tremolos, which simulate a whole battery of bass drums, can be performed by depressing the sustaining pedal and playing a tremolo with both hands on the lowest strings.
5. Some composers (i.e., Bernstein in *The Age of Anxiety*, Copland in *Billy the Kid*) ask for upright pianos to suggest the "local color" of the barroom or music hall.
6. Toy pianos may be employed for special effects.

Before illustrating some successful uses of the piano in its various functions as an orchestral instrument, it is important to call attention to some extraordinary works where multiple pianos and percussion take the place of an entire orchestra. Two of the most important of these are Stravinksy's *Les Noces* and Orff's *Catulli carmina.*

Orchestral Uses of the Piano

Piano as a doubling instrument:

Example XIII–2. Stravinsky, *Petrushka*, "Danse russe," mm. 1–9



Example XIII–3. Shostakovich, *Symphony No. 1*, second movement, mm. 113–18



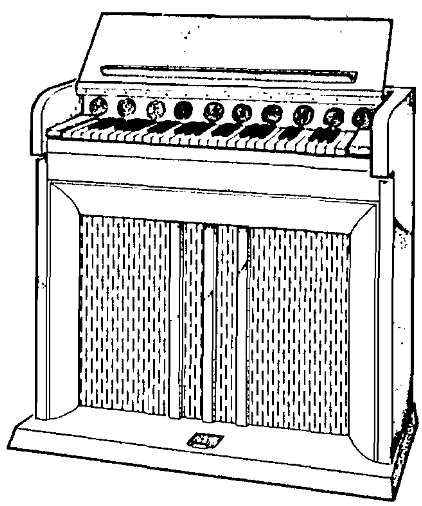
As an accompanying instrument:

Example XIII–4. Bernstein, *On the Town*, "Times Square," mm. 1–5



CELESTA

Céleste (Fr.)



Example XIII–5. Range (sounds one octave higher than written)



The celesta is a steel-bar piano, which looks like a miniature version of that instrument and sounds very much like a glockenspiel. The mechanism of the celesta works in the following manner: felt hammers strike steel bars, which lie across a small wooden resonator box. The tone is soft and delicate, and even though it has quite a bit of penetrating power because of its high frequencies, it is by no means as piercing as the glockenspiel. The instrument has a damper pedal, and the notes do not sustain too long; but since they are produced by striking metal bars over a resonator, there is no true short staccato. Melodic lines, chords, and arpeggios are all most effective on the celesta, which is usually played by the pianist of the orchestra. Besides solo celesta passages, some of the most exciting pages of music for this instrument occur when it doubles the strings, the harp, the piano, soft woodwinds, and gives a "silver lining" to the overall sound. The celesta is probably used more frequently in the orchestra than any other keyboard instrument.

Here are some outstanding examples of celesta passages:

Example XIII–6. Tchaikovsky, *The Nutcracker*, "Dance of the Sugar Plum Fairy," mm. 5–12

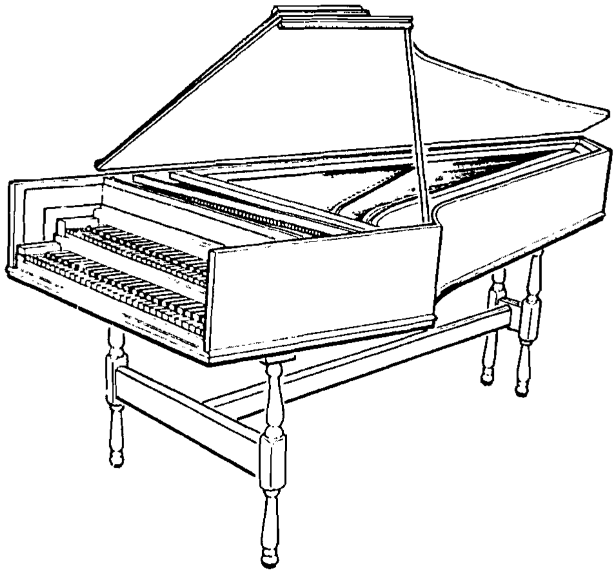


Example XIII–7. Strauss, *Der Rosenkavalier*, Act II, Octavian's aria "Mir ist die Ehre," [25], mm. 1–6

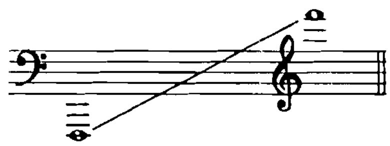


HARPSICHORD

Cembalo (It. and Ger.), *Clavecin* (Fr.)



Example XIII–8. Range



The harpsichord is really a plucked stringed instrument: instead of being struck by hammers, the strings are plucked by crow quills or leather tabs. Usually five to eight pedals or hand-pulled pistons operate register stops, and since the big harpsichords have two keyboards, there is a coupler to combine the registrations on the two. This affords a great deal of variety in the tone quality and adds strength to the instrument by joining the keyboards together.

During the Baroque era and even in some of the early Haydn symphonies, the harpsichord was always present in the orchestra to realize the continuo parts. When the style changed and the orchestra expanded, there was no longer a need for the instrument as an integral part of the ensemble, and because of its relatively small sound, it was replaced by the piano as the keyboard solo instrument. Some harpsichords, called pedal harpsichords, have a full organ pedal keyboard. These are rare, and one has to request them specially. For the last fifty years at least, there has been a renewed interest in building harpsichords and in using it as part of the orchestra. Composers have seen fit to use it in the orchestra for color, but care must be taken that this rather delicate instrument is not overwhelmed. It is advised that it be heard alone or in combination with instruments

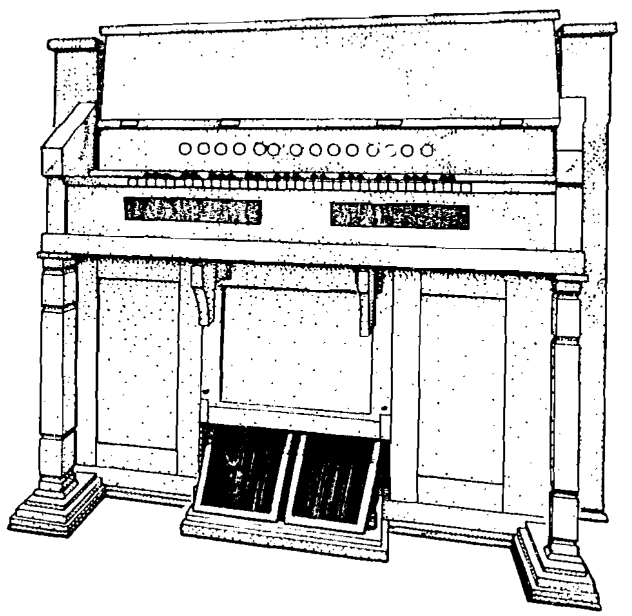
capable of playing quite softly. Some composers have written for amplified harpsichord (Penderecki, *Partita*); in those cases the harpsichord is not so much at a disadvantage. Some successful uses of the harpsichord today are in the following works: De Falla's *El Retablo de Maese Pedro*, Martin's *Petite Symphonie Concertante*, Strauss's *Dance Suite after Couperin*, Carter's *Double Concerto*, Powell's *Miniatures for Baroque Ensemble*.

Example XIII–9. Powell, *Miniatures*, fourth movement, mm. 1–5



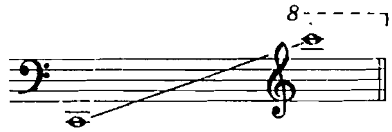
HARMONIUM

Organetto (It.)



The harmonium is a small pump organ, sometimes called a reed organ. It has either one or two keyboards and a range of five octaves:

Example XIII–10. Range



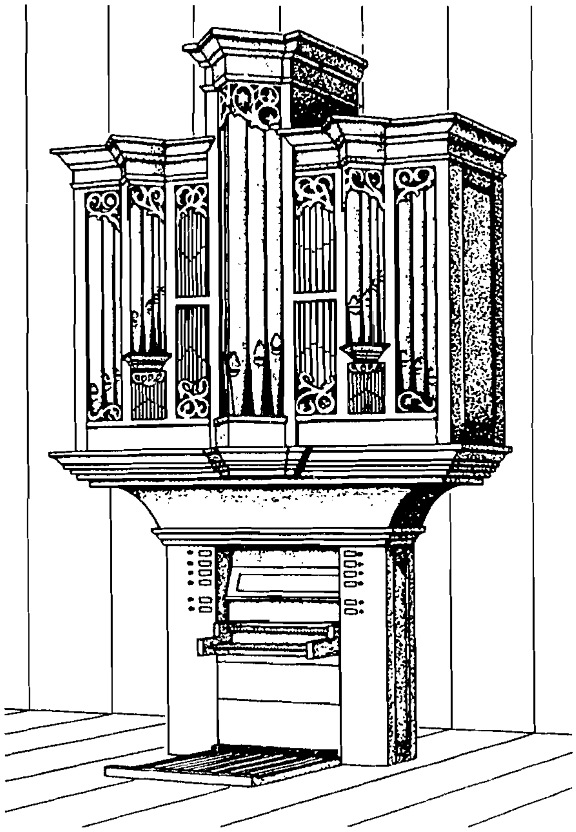
Some harmoniums have as many as fifteen organ stops, which change the tone quality and extend the range an octave below and an octave above. These instruments are rare in our time when the harmonium is infrequently used. The player pumps two pedals below the keyboard, which set the air in motion to work the bellows inside the instrument; these, in turn, activate the reeds when the keys are depressed. Relatively few works use the harmonium, although it did have a renaissance during the 1920s and seems to be coming into vogue again today. The parts usually resemble substitute organ parts.

Example XIII–11. Strauss, *Ariadne auf Naxos*, mm. 80–89

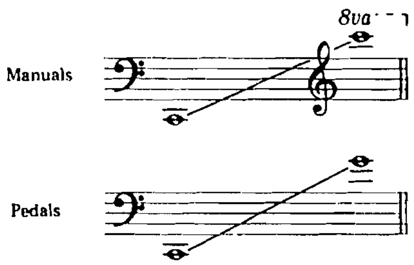


ORGAN

Organo (It.), *Orgue* (Fr.), *Orgel* (Ger.)



Example XIII–12. Range



The early history of the organ in the orchestra is a very long one, predating the Baroque period. It was indispensable as a continuo instrument and also as a frequent soloist with orchestral accompaniment. Once again, as in the case of the harpsichord, when the style changed and continuo became an antiquated technique, the organ was relegated to the church and disappeared as an integral member of the orchestra. It did retain its position in the opera house, where it was called upon from time to time to simulate a religious scene. Meyerbeer in *Le Prophète*, Gounod in *Faust*, Halévy in *La Juive*, Verdi in *Otello*, and Wagner in *Lohengrin* were some of the composers who used the organ successfully to portray religious feelings in their operas. Solo music for organ was quite popular especially at the beginning and middle of the nineteenth century with Mendelssohn, Schumann, Brahms, and Reubke. Not until Saint-Saëns's *Symphony No.*

3, however, was there a major concert work written with organ since the Baroque and early Classical periods. After that, Mahler (*Symphony No. 8*) and Strauss (*Also sprach Zarathustra*) must have convinced twentieth-century composers of the feasibility of the organ as an orchestral instrument. Quite a few organ concertos have been written in the past fifty years, and solo music from France, Germany, England, and the United States is voluminous. The great attraction of the organ as an orchestral instrument is its ability to sustain pitches for an indeterminate period, and also that there are many combinations available to complement or contrast the orchestral colors. Unfortunately, many concert halls do not have a pipe organ, and often an electronic organ or a small positiv organ with insufficient power and color is substituted for a large pipe organ which the composer had in mind.

Example XIII–13. Saint-Saëns, *Symphony No. 3*, first movement, mm. 350–63.



Additional keyboard passages:

Copland, *Symphony No. 3*, second movement, mm. 115–20 (piano)

Stravinsky, *Petrushka*, second tableau, mm. 19–32 and 62–67 (piano)

Stravinsky, *Oedipus Rex*, [19], mm. 1–11 (piano)

Berg, *Lulu Suite*, "Ostinato," mm. 37–45 (piano)

Stravinsky, *Les Noces*, pp. 71–72 of score (4 pianos and percussion)

Stravinsky, *Symphony of Psalms*, last movement, p. 57 of score (piano)

Schreker, *Kammersymphonie*, first movement, beginning to [3] (piano, celesta, harmonium)

De Falla, *Concerto for Harpsichord*, second movement, pp. 22–23 of score

Colgrass, *As Quiet As*, second movement (harpsichord)

Shostakovich, *Symphony No. 5*, first movement, [5] (piano and strings pizzicato); last 4 measures (celesta)

Foss, *Time Cycles*, second movement, mm. 171–75 (celesta)

Bartók, *Music for String Instruments, Percussion, and Celesta*, third movement, mm. 34–43

Webern, *Five Pieces for Orchestra*, Op. 10, No. 5, mm. 9–10, m. 15, m. 21 (harmonium)

Respighi, *I Pini di Roma*, fourth movement, [20] to end (organ)

Strauss, *Also Sprach Zarathustra*, mm. 19–21 (organ)

Respighi, *I Fontane di Roma*, fourth movement, [20] to end (organ)

Toch, *Chinese Flute*, "Procession of the Monks" (celesta in different key from the strings)

Hovhaness, *As on the Night* (celesta in different key from the strings)

Trimble, *Four Fragments from the Canterbury Tales*, "Prologue," pp. 1–4 (voice, flute, clarinet, harpsichord)

Berio, *Concertino*, mm. 1–6 (celesta)

14

Scoring for Percussion with Keyboard Alone or in Combination

On page 368, there is an admonition by Walter Piston concerning the volume of the percussion section vis-à-vis the rest of the orchestra. Perhaps before we launch into a further study of how the orchestral percussion section has been most successfully used in the past, another word of warning is in order, since the inexperienced orchestrator too often overworks the percussion section, frequently obscuring important musical details. Bernard Rogers, in his fine book *The Art of Orchestration* * wisely advises, "In writing for percussion, the sanctified tradition is the less the better."

This chapter is divided into two parts: the first is an extension of the previous two chapters and will cover the major problems of score placement as well as special notation for percussion and keyboard instruments; the second part deals with the tremendously varied use of the percussion-keyboard ensemble in combination with other choirs of the symphony orchestra.

* New York: Appleton-Century-Croft, 1951, p. 76.

ARRANGEMENT IN THE SCORE

The percussion and keyboard section is traditionally placed between the brass and the strings on the score page, with the timpani appearing first. Since there are at most three to four percussion players in a symphony orchestra, not including the timpanist and keyboard player, and since these few percussion players are asked to perform on a multitude of different instruments, it is imperative that the composer or orchestrator arrange the percussion section of the score very carefully and that the notation be instantly legible.

There are many schools of thought concerning score setup. There is even a "cop-out" school that says, "Place the instruments any old way and let the players figure it out for themselves." This is certainly not the way to solve the problem. Let us find an approach that is clear and logical:

1. Order in which keyboard instruments appear in the score: highest one at the top, then in descending order:

Glockenspiel
Xylophone
Vibraphone
Marimba
Chimes
Celesta
Piano
Harpsichord
Organ

Of course, not all of these instruments are used in every score, but when any of them do appear, they should be arranged in this sequence in the score. All these instruments are usually placed *below* the timpani and the nonpitched percussion instruments. If harps are called for, they should be placed *above* all the keyboard instruments. Let us say that the percussion section at a particular spot in a large work consists of the following instruments: timpani, harp, xylophone, and celesta; the setup would be:

Timpani
Harp
Xylophone
Celesta

2. Order of nonpitched percussion:
   a. The high to low principle should be observed.
   b. Another principle of organization of this group is by materials:

I. Metal
II. Wood
III. Membrane

Since there are so many nonpitched instruments, let us take only a few of the most common and set them up in suitable score sequence, remembering that as a group they are placed immediately below the timpani. We will rearrange the following instruments: snare drum, bass drum, triangle, tambourine, sleigh bells, wood blocks, tenor drum, temple blocks, cymbals, and a tam-tam. According to our guidelines above, here is the order in which they would appear in the score:

Triangle
Sleigh Bells
Cymbals
Tam-tam
Wood Blocks
Temple Blocks
Tambourine
Snare Drum
Tenor Drum
Bass Drum

Of course, it is unusual to find all these percussion instruments playing at the same time in an orchestral work. The assignment of a particular group of instruments to any one particular player is not of great importance unless:

1. The physical disposition of the instruments is predetermined;
2. Two instruments must be played at the same time, in which case
   a. the player will use a different beater in each hand;
   b. the player will use the same beater(s) for both instruments or each instrument will be played with one hand only.

Player I — Triangle; Cymbal with stick; Snare Drum

Player II — Tam-tam; Tenor Drum; Bass Drum

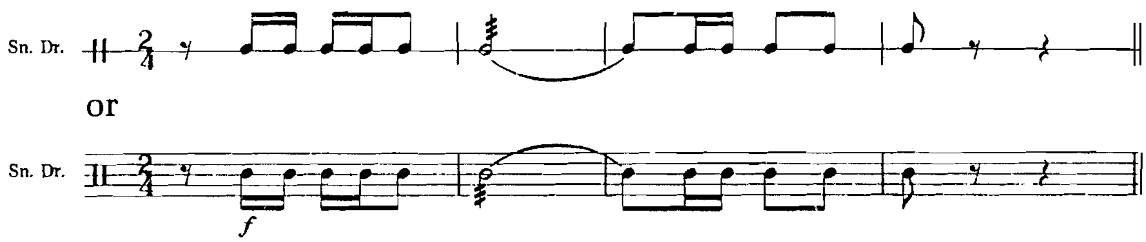
Player III — Sleigh Bells; Wood Blocks; Temple Blocks; Tambourine

Player I could strike two instruments at the same time. Players II and III would also be able to do the same thing by having a different beater in each hand.

Here is where notation is very important. We need not discuss the notation for the pitched percussion instruments, for they present no particular problem, except that we must be warned that all instruments, no matter where they are placed on the score, must be diligently labeled.

1. Nonpitched percussion with no variation in sound (i.e., maracas, claves) may be notated on a single line, which may be either a one-line staff or a line or space within a five-line staff.

Example XIV–1



Notice that the "percussion clef" || is used on the single line or centered on the third line of a five-line staff.

Let us suppose we have one player playing snare, tenor, and bass drums. We may use either of two methods: one line for each instrument, or the five-line staff, as follows:

Example XIV–2

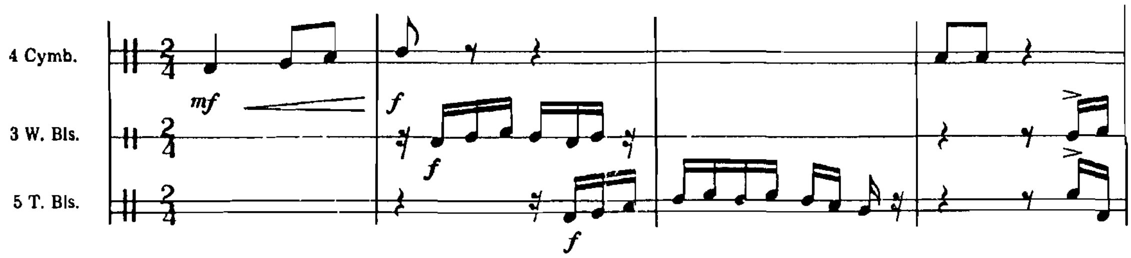


The stems of the tenor drum may go up or down, but either way, these would certainly be clear and concise ways of notating the three instruments. Both methods of notation are equally valid if three different players are performing the three different parts.

2. Nonpitched percussion with pitch variations:

When three wood blocks, five temple blocks, three timbales, or four cymbals of different sizes are used, there are again three accepted methods of notating clearly. Either the one- or two-line staff or the five-line staff may be used, in the following manner:

Example XIV–3

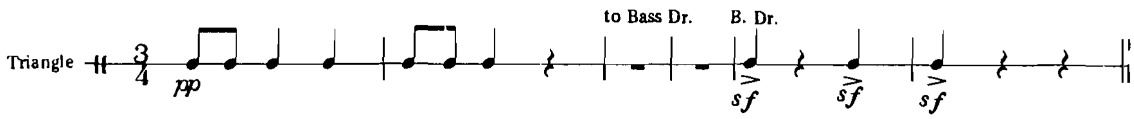


or



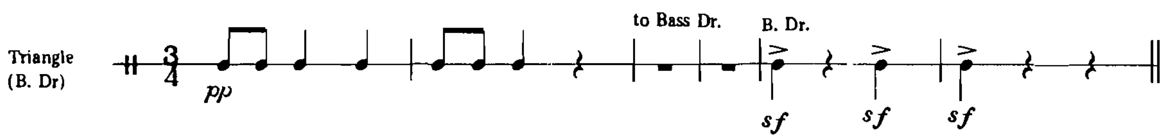
There are many instances where a composer wishes to have a player perform on two instruments in very close proximity, and often this is notated on one line.

Example XIV–4



This is certainly a space-saving solution, especially if there is only one percussion player or if there is very little written for the percussion section in the work. But one further refinement would make this notation even clearer: the bass-drum stems should go down instead of up to differentiate further between the two instruments.

Example XIV–5

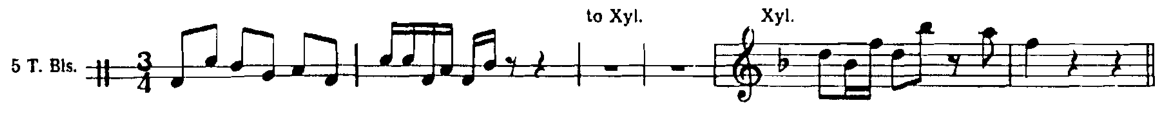


One crucially important fact must be kept in mind whenever one player is called upon to switch from one instrument to another: one must allow enough time for the player to change sticks. It is not so bad between triangle and bass drum, for example, for the player can hold a triangle beater in one hand and a bass drumstick in the other.

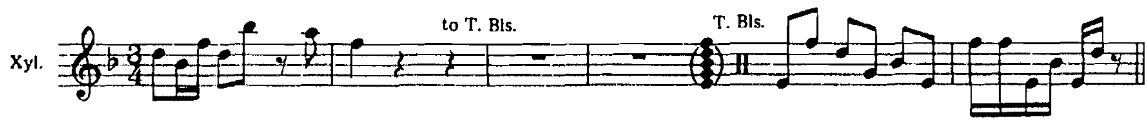
However, if the switch were between a triangle and a snare drum, the performer must put down the triangle beater and ready the two snare drumsticks in order to play on the latter instrument.

There is another notation problem that concerns switching from a nonpitched to a pitched percussion instrument printed on the same line and played by the same performer. Here are two clear ways of solving this particular problem:

Example XIV–6



or



Notice again that some time has to be allotted for the player to switch from mallets to sticks, unless the composer wishes both instruments to be performed with xylophone mallets. Certainly this is possible, and less time will elapse between the performances of the two instruments, for the player will position them in such a manner that he is able to play them both at the same time.

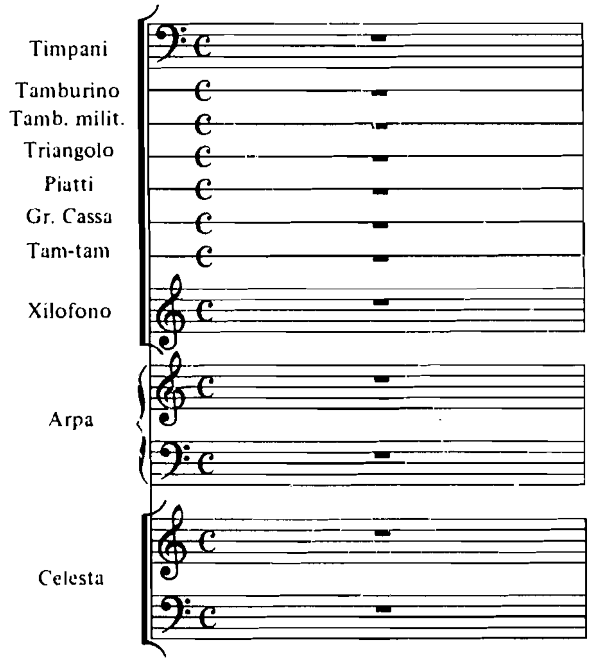
Here are some percussion placements on scores from orchestral works using large percussion sections:

Example XIV–7. Mozart, Overture to *Die Entführung aus dem Serail*, mm. 1–9



etc.

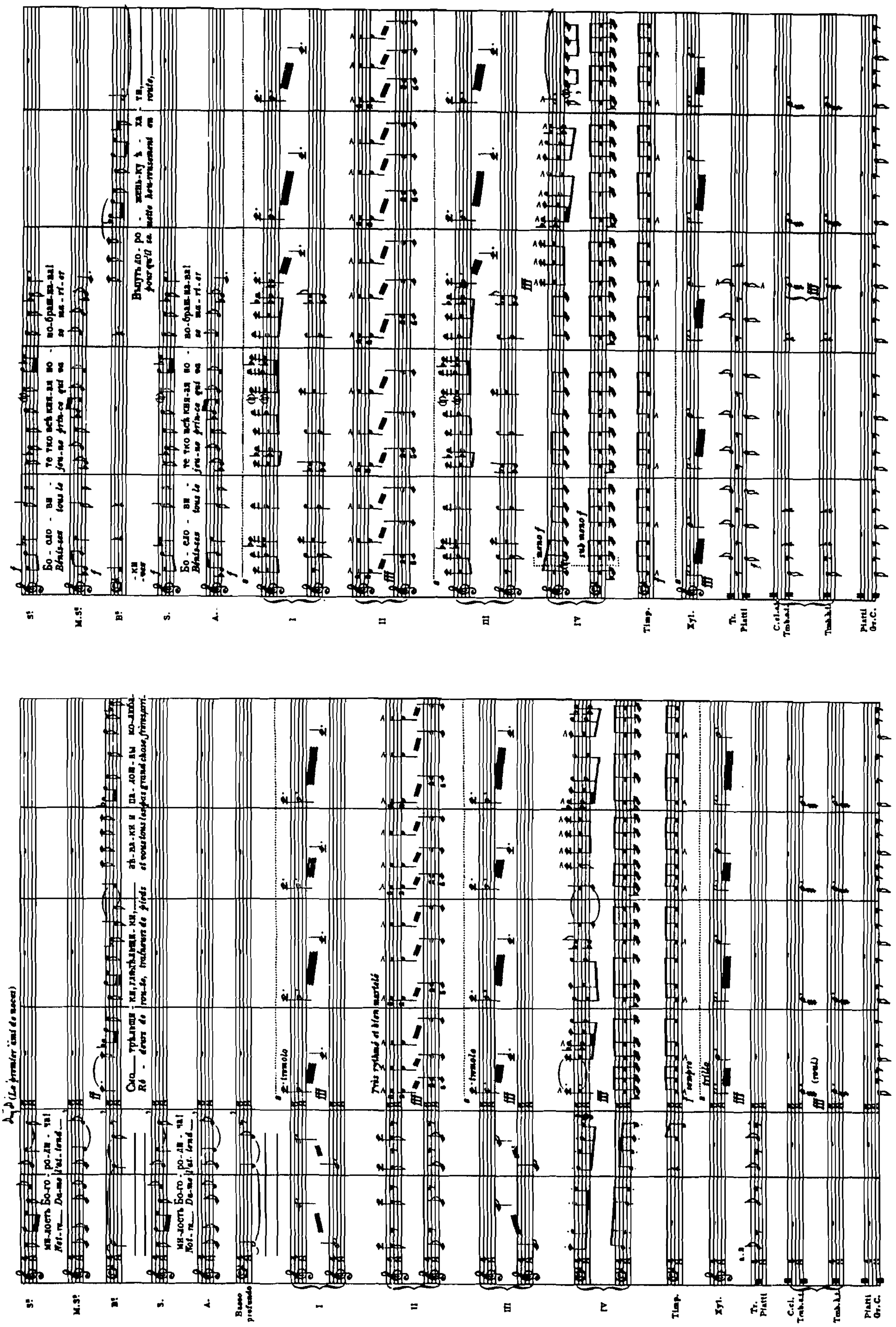
Example XIV–8. Shostakovich, *Symphony No. 6*, opening



Example XIV–9. Orff, *Carmina burana*, No. 14, "In taberna quando sumus," mm. 83 -96



Example XIV–10. Stravinsky, *Les Noces*, second tableau, mm. 163–73



PERCUSSION SECTION SETUP

Unless a particular effect is called for (as in an antiphonal work) or the composer/orchestrator has had first-hand experience with the problem of choreographing this very complex section, it is best to leave the physical setup to the players themselves. Most professional percussion sections have developed their own favorite, sometimes idiosyncratic setups. It is best to list all the percussion instruments clearly at the beginning of the score, as well as in the percussion parts, and leave the assignment and placement up to the section leader. If three or four players are demanded, be sure that they are able to handle all the instruments required in the score at any given moment in the piece, and that enough time is allowed for each player to be able to go to his next instrument or group of instruments. It is better to ask for an extra player in a work with an extremely active percussion section than to demand that too few percussionists cover a multiplicity of instruments.*

Here are some examples of a few percussion-section placements suggested in scores by contemporary composers.

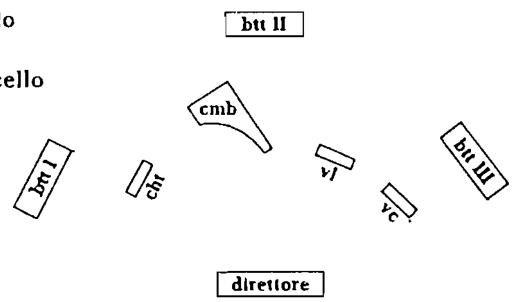
Example XIV–11. Kotonski, *a battere*

batteria I
- 3 piatti (alto, medio, basso)
- hi-hat
- 2 cymb. antiques (in Si e Si♭)
- 4 cow bells
- tam-tam (medio grande)

batteria II
- 3 piatti (alto, medio, basso)
- cow bell
- triangolo
- Almglocke (la più grossa)
- gong giavanese (o gran tam-tam)
- piatto (posto orizzontalmente sul timpano a ped.)

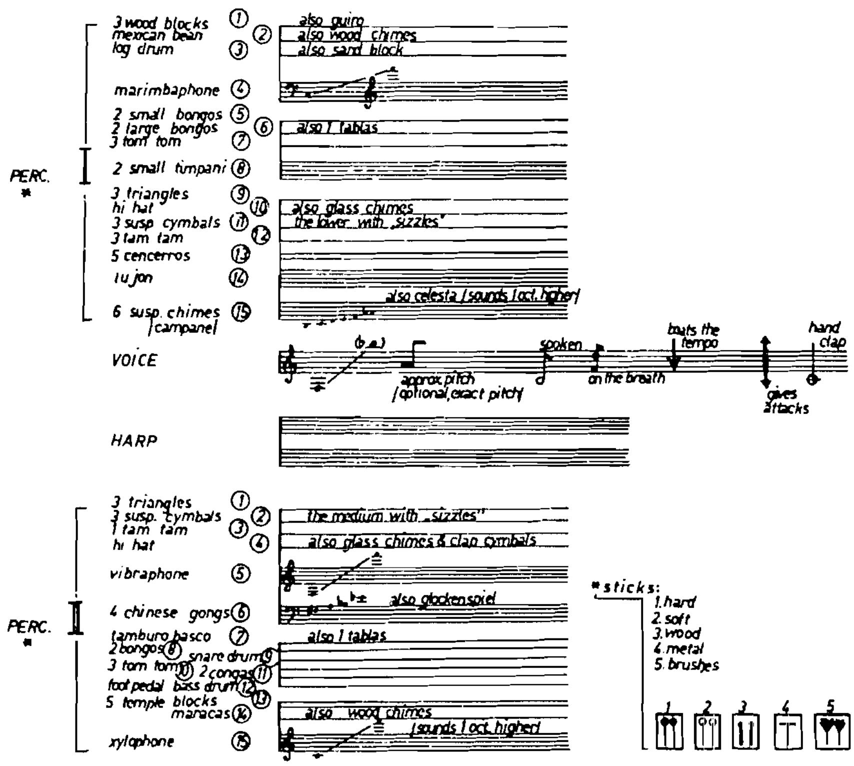
batteria III
- 3 piatti (alto, medio, basso)
- hi-hat
- 4 Almglocken
- 2 cymb. antiques (in Mi e Fa)

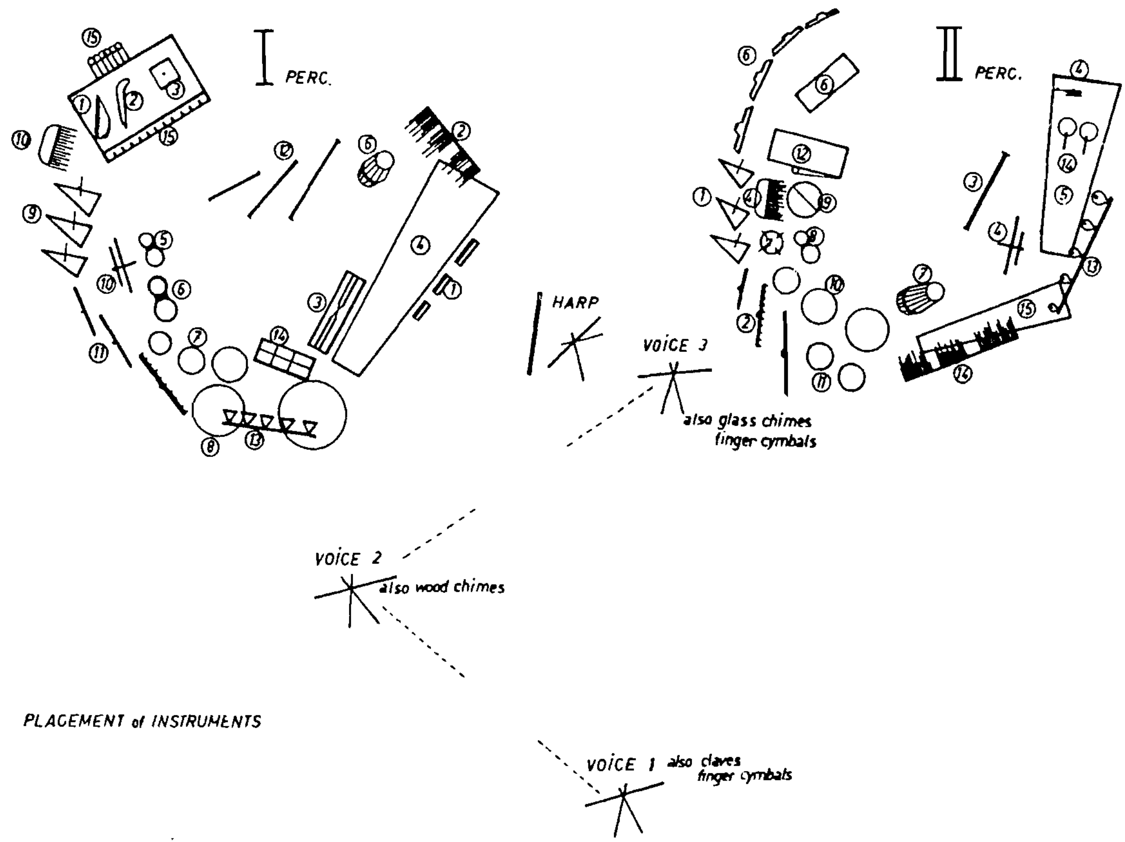
chitarra
cembalo
viola
violoncello



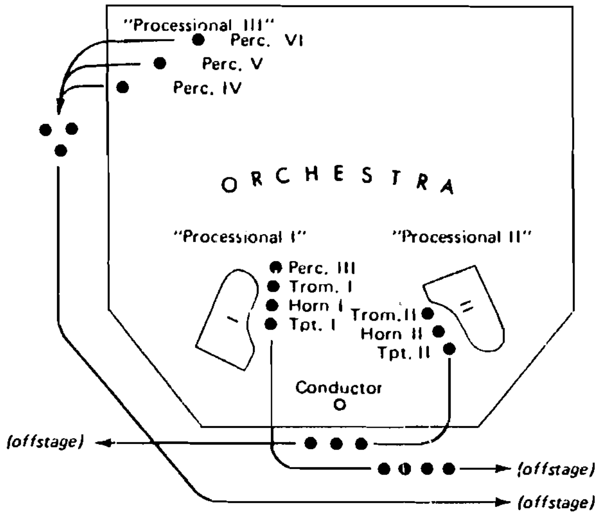
*There are extreme examples of huge percussion sections before our own time. Respighi in *Feste romane* asks for fourteen different percussion instruments, ten of which play at one time in a section of the work. No orchestra is going to hire ten players, so some will of necessity be left out, at least in American orchestras.

Example XIV–12. Berio, *Circles*





Example XIV–13. Crumb, *Echoes of Time and the River*



USES OF THE PERCUSSION SECTION

1. Historically, the percussion section has been used to simulate march music (i.e. *à la Turque*) or to lend an ethnic flavor. (This does not apply to the early timpani.)
2. The percussion section serves to emphasize accents and general rhythmic activity.
3. It is used to build or to "cap" a climax. Under this category we may also include the shock value of a cymbal struck at the very beginning of a work (Prelude to Bizet's *Carmen*, for instance).
4. It may also color certain pitches or entire passages by doubling other instruments in the orchestra.

Of course, there are many other uses for this most colorful section of the modern orchestra, but these are the most important. Lately, given the expansion of the percussion section and the extraordinary technical skill of our performers, composers have been using percussion, especially pitched percussion, as an independent section, often alternating with another choir of the orchestra.

Let us look at some examples from the great orchestral literature. Since we are concerned with orchestral literature rather than chamber or percussion repertoire, we shall omit works such as Varèse's *Ionization*, which of course is for percussion alone. In our discussion we shall include the harp and keyboard instruments, since these are most often placed together with the percussion group.

March and Ethnic Music

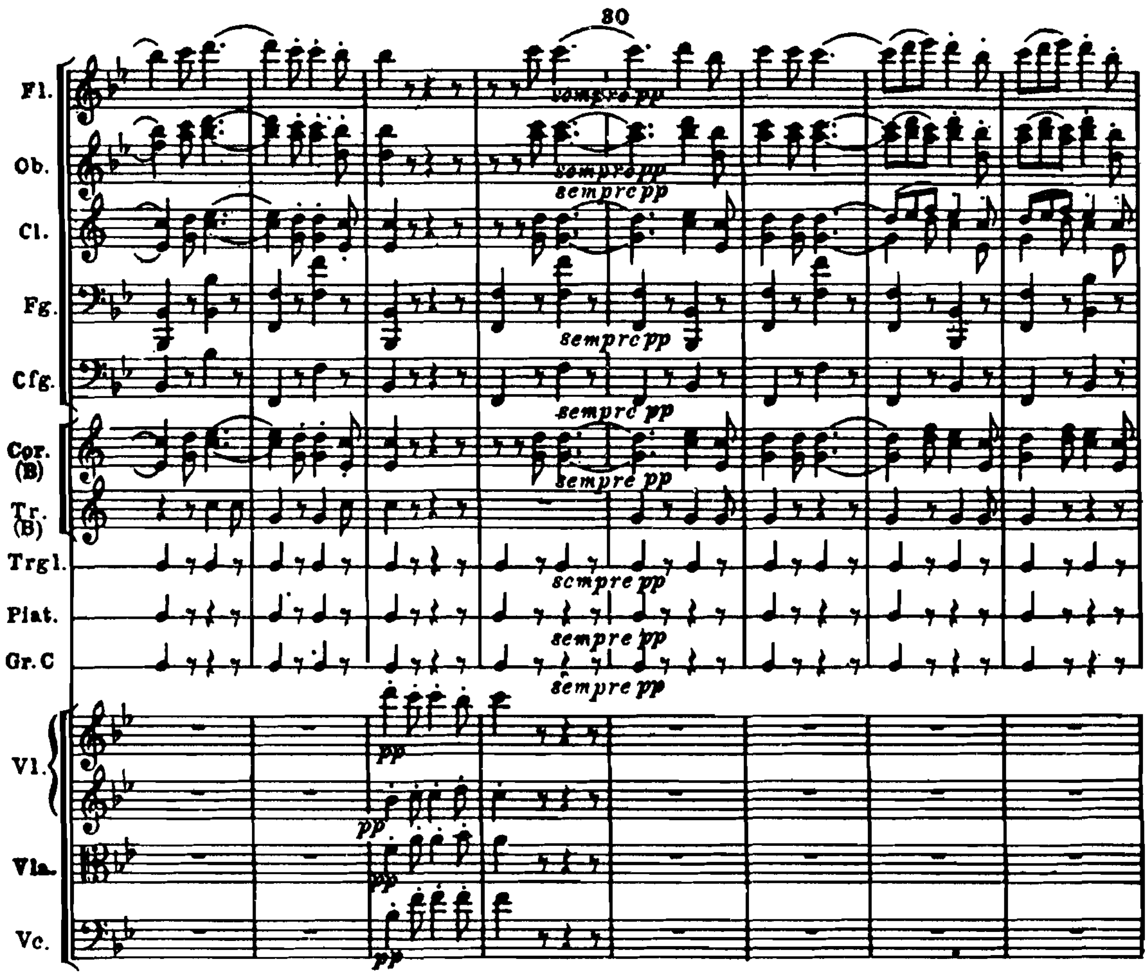
An example from Beethoven's *Ninth Symphony* typifies the marchlike percussion group so popular with Classical as well as the early Romantic composers for conjuring up the spectre of marching soldiers, wars, or any other kind of strife. Notice that the timpani are not used, for they were not considered part of this particular percus-

Example XIV–14. Beethoven, *Symphony No. 9*, fourth movement, Alla marcia, mm. 1–33




10
Fl.
Ob.
Cl.
Fg.
Cfg.
Cor. (B)
Tr. (B)
Trgl.
Piatti
Gr.C.
fp
pp
pp sempre

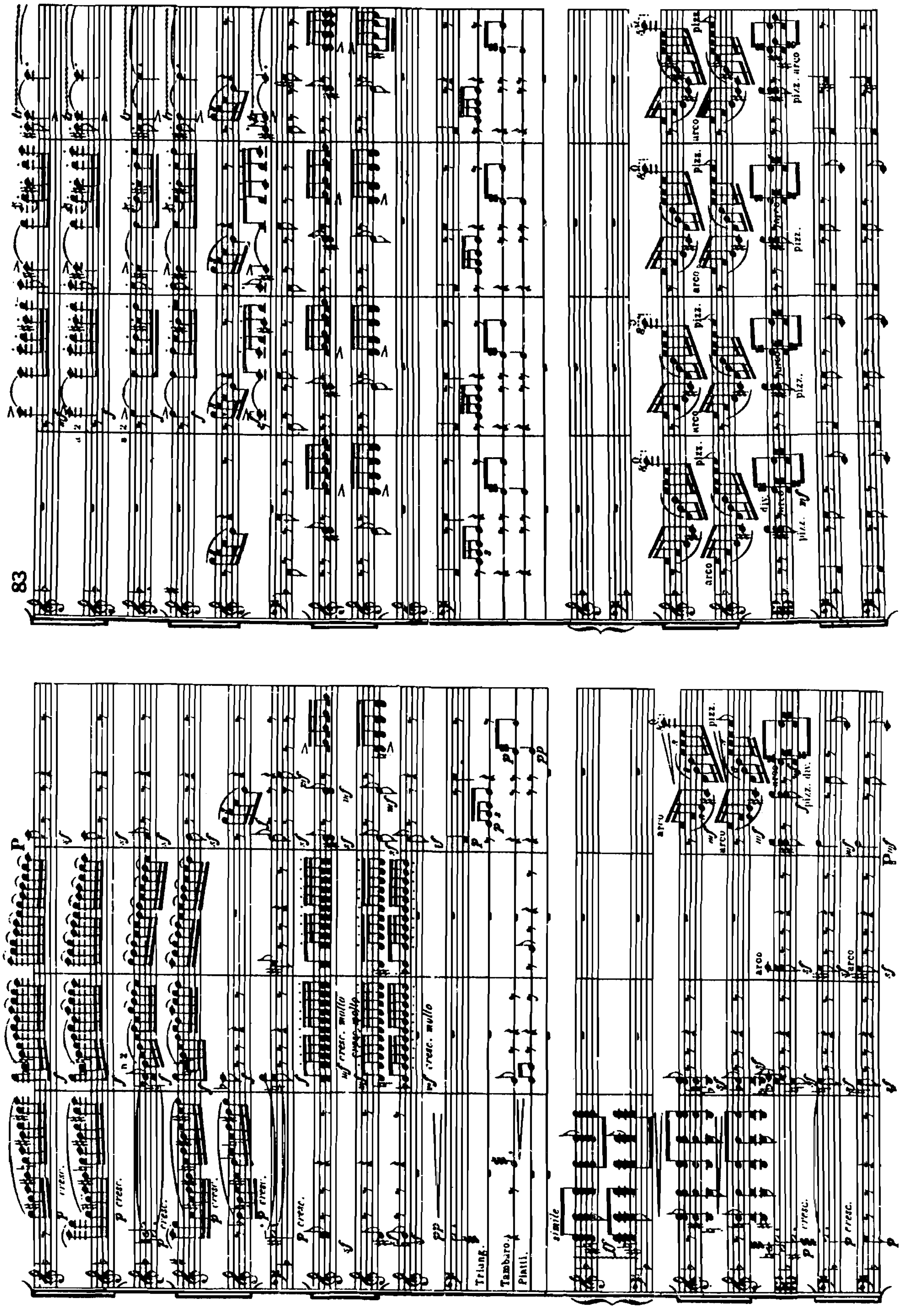

20
Fl.
Ob.
Cl.
Fg.
Cfg.
Cor. (B)
Tr. (B)
Trgl.
Piat.
Gr.C.

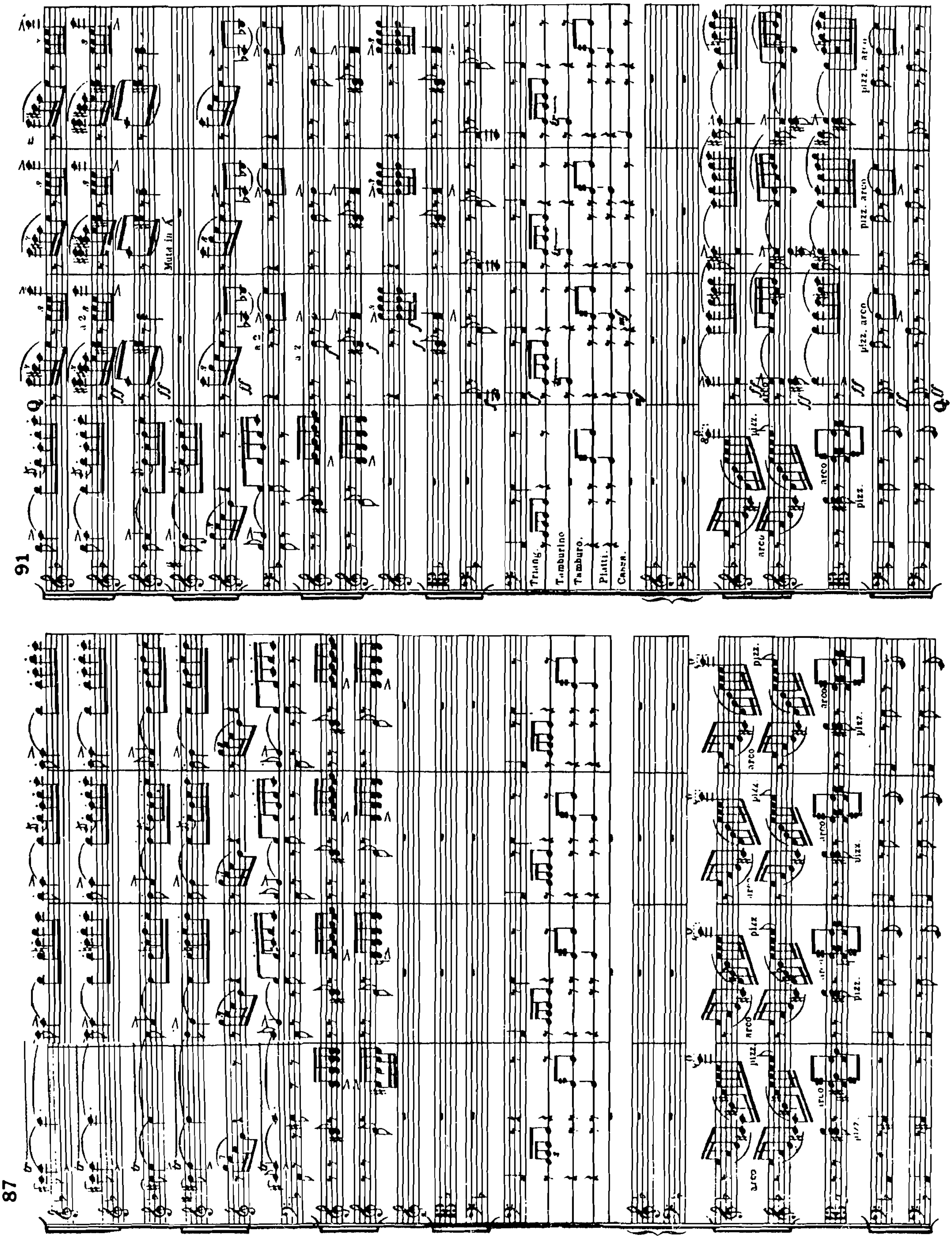


sion group which, as mentioned before, was usually called the "Turkish instruments." The variation begins with the bass drum only, giving an accent to the bassoons and the contra. Then it is joined by the triangle and cymbals when the tune enters in the winds and horns. There is a gradual crescendo in the score, as if a band were coming toward us from afar.

In the next example, the *Capriccio espagnol*, Rimsky-Korsakov combines tambourines and castanets to suggest the dance music of Spain. This had become a cliché with composers of the eighteenth and nineteenth centuries. However, one must not condemn it, for it does conjure up the Iberian peninsula with reliable immediacy. The same instruments are used to suggest any region around the Mediterranean, since they often appear in "Italian" and even "Moroccan" pieces.

Example XIV–15. Rimsky-Korsakov, *Capriccio espagnol*, fourth movement, mm. 79–98




91
Q
Triang.
Tamburino
Tamburo.
Piatti
Cassa
Muta in A
pizz.
arco
87



Rhythmic Emphasis and Accents

The second common usage of percussion instruments is for rhythmic emphasis or sharp accents. Let us examine several places in the same work that illustrate the imaginative use of different instruments for that purpose. We shall draw our examples from Copland's *Appalachian Spring*.

1. Xylophone reinforces every high accent, while the tabor (or long drum) lends support to the stopped horn (low accent).

Example XIV–16. Copland, *Appalachian Spring*, mm. 46–54



2. The piano gives emphasis to the *sfp* effect in the strings.

Example XIV–17. Copland, *Appalachian Spring*, mm. 55–61



3. The wood block supports the off-beat accent.

Example XIV–18. Copland, *Appalachian Spring*, mm. 225–28



4. The triangle adds to the excitement and buildup of the run leading to a sharp accent; then the snare drum, first with a brush, then with a stick on the rim, gives added emphasis to the off-beat in order to create a lighter downbeat impression.

Example XIV–19. Copland, *Appalachian Spring*, mm. 229–44





5. A very dry wood color, the claves, strengthens the high accents at this rhythmically exciting spot. Notice that when this music returns at the end of this section, Copland adds xylophone and strings, finally crowning the climax with a series of solo timpani strokes aided by bass pizzicatos.

Example XIV–20. Copland, *Appalachian Spring*, mm. 375–82



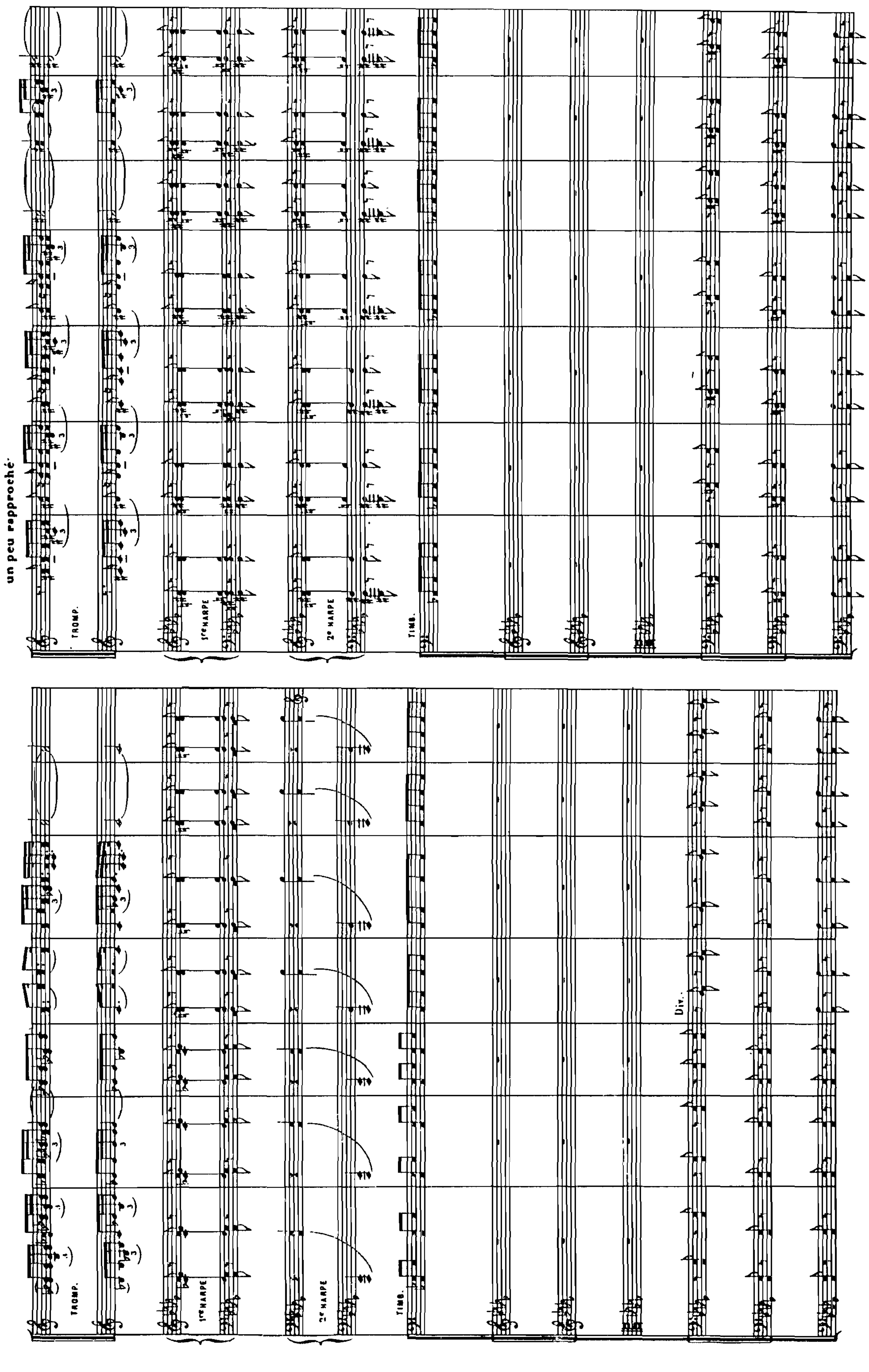
Climactic Effects

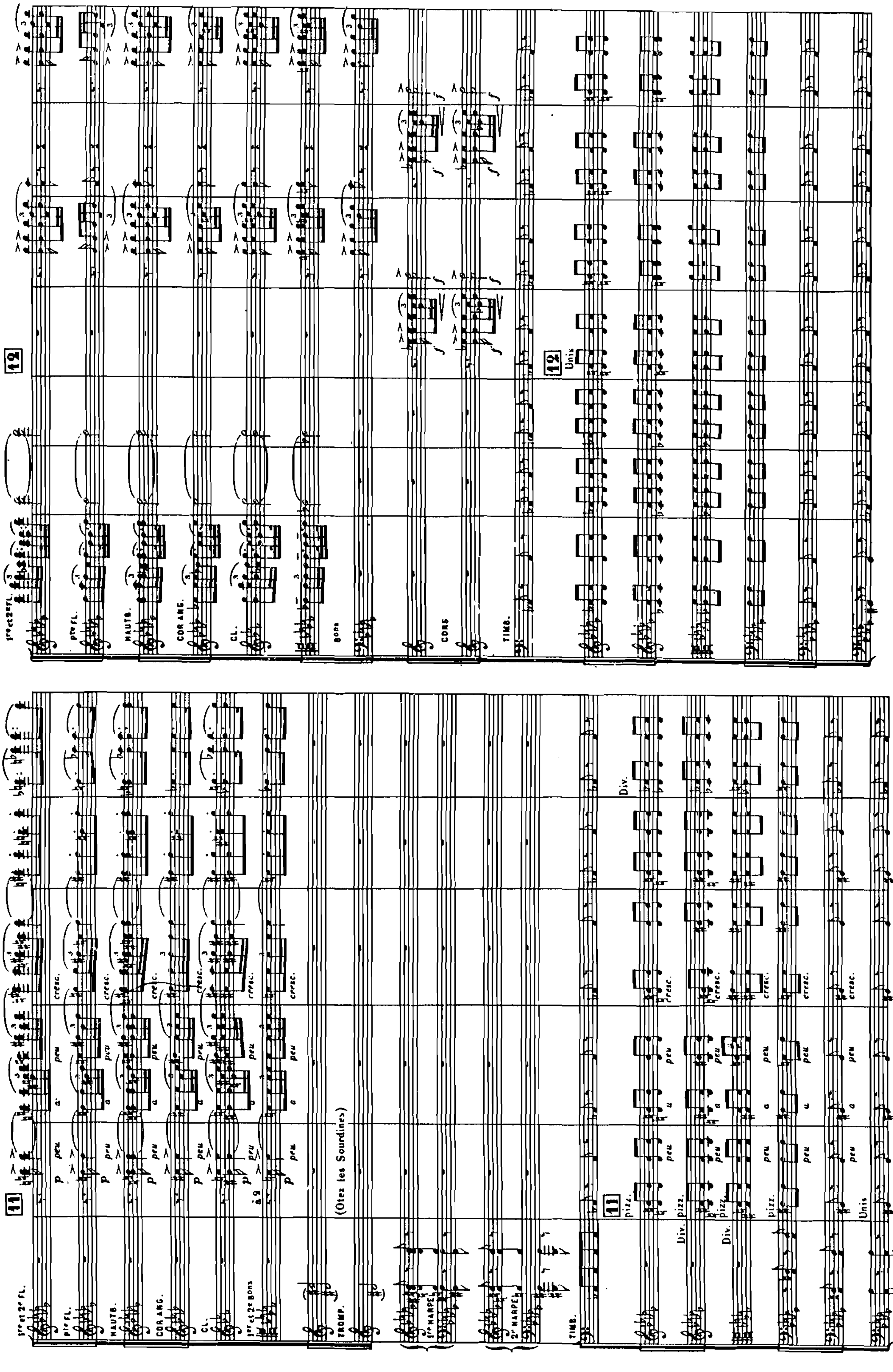
Using the percussion section to build a climax and then help to sustain it is a stunning device employed by many of the great masters. The percussion may sometimes aid in this buildup with an ostinato or other kinds of repeated gestures. Alternative is to hold back the percussion until the climactic moment. In this portion of the chapter, we shall look at a number of examples of successful climaxes which will give us hints on how to use the percussion most effectively in those situations.

Debussy, *Fêtes*, from *Nocturnes:* At [10], an extremely soft steady beat begins in the timpani, supported by harps and pizzicato strings. The beat continues under the theme until [11], when the timpani changes the ostinato to single strokes on the first and second beat.

Example XIV–21. Debussy, *Nocturnes: Fêtes*, from [10] to [14]

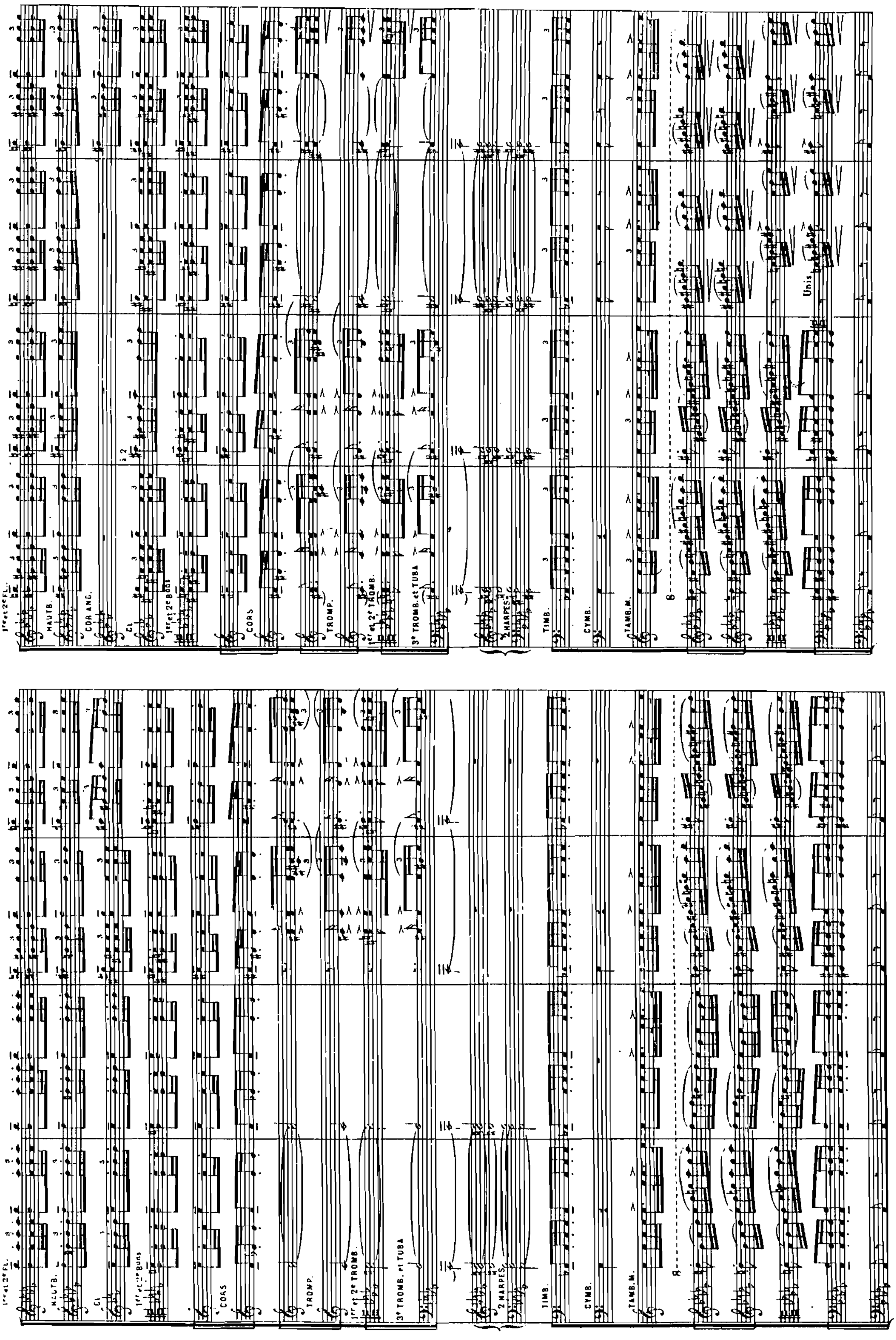



un peu rapproché
TROMP.
1re HARPE
2e HARPE
TIMB.
Div.



12
11
(Otez les Sourdines)
pizz.
Div.
Unis
cresc.


1er et 2e FL.
HAUTB.
CL.
CORS
TROMP.
3e TROMB. et TUBA
2 HARPES
TIMB.
CYMB.
TAMB. M.
45
Div.
molto cresc.


HAUTB.
COR ANG.
Cl
CORS
TROMP.
3e TROMB. et TUBA
2 HARPES
TIMB.
CYMB.
TAMB. M.
Unis

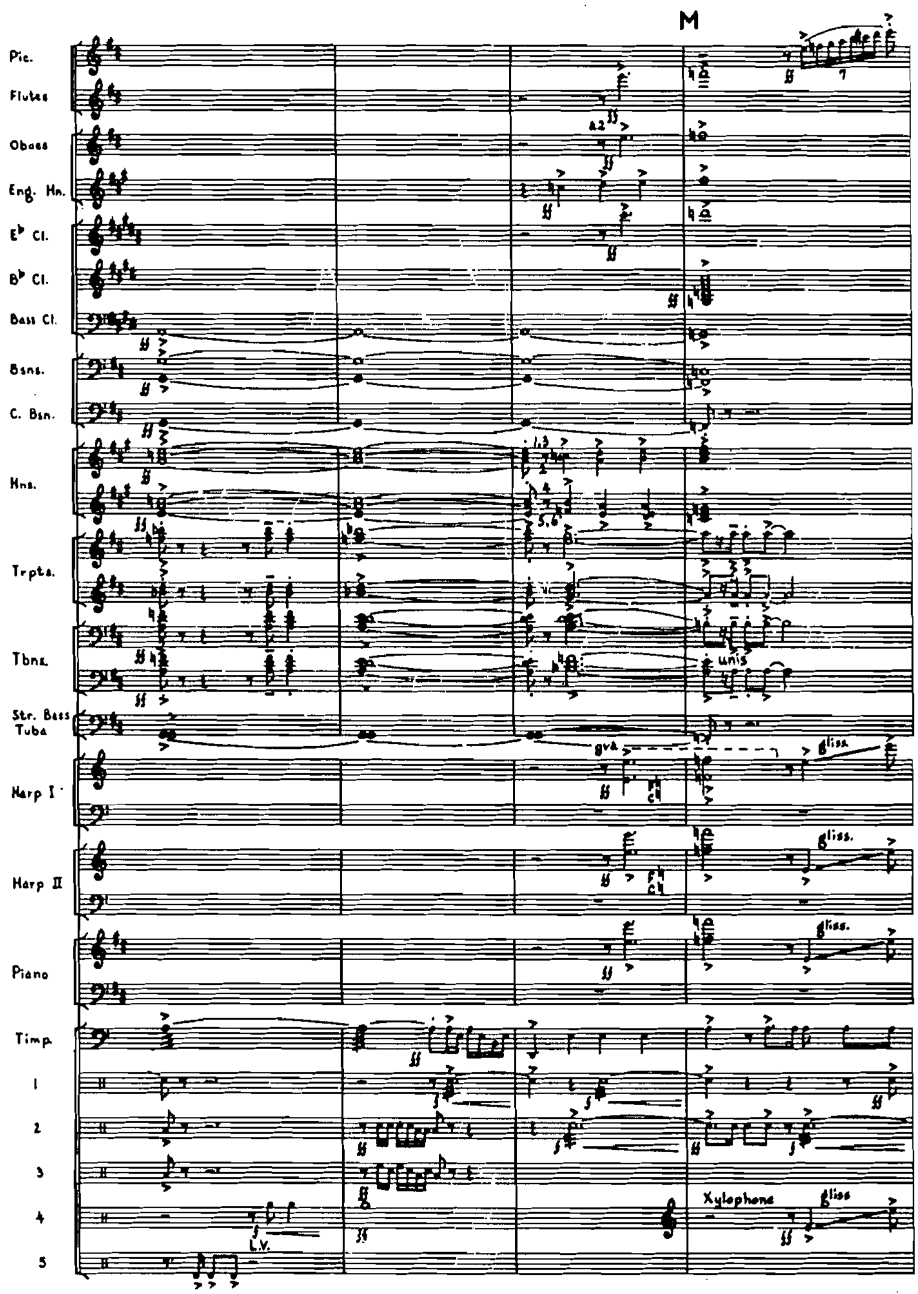


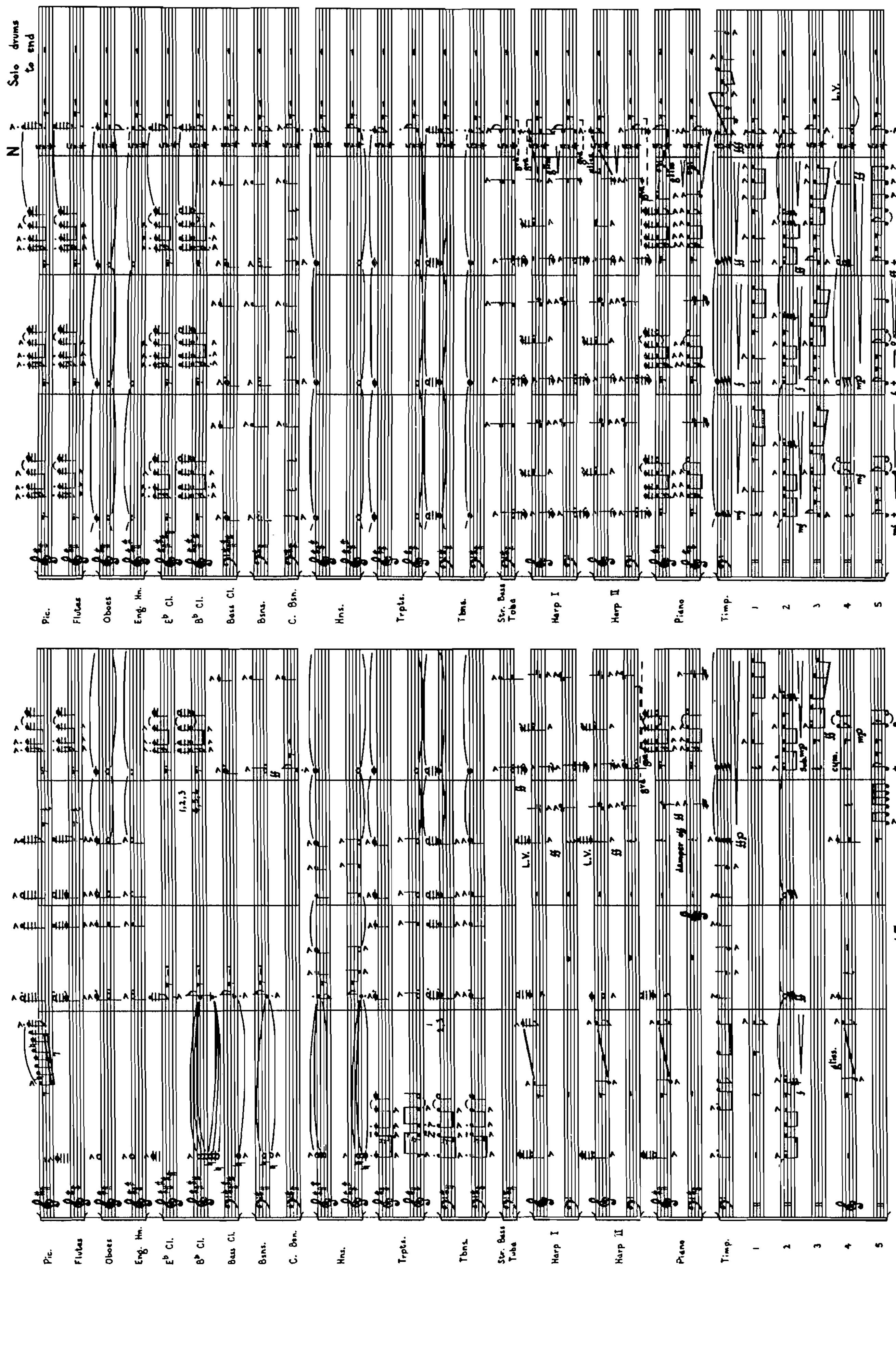
Still, melodic fragments are heard in the winds and horns, and there is a steady crescendo to 13, when the timpani ostinato becomes the "theme figure" and keeps driving toward the climax at 14. Interestingly enough, the climax is broken off suddenly, and the beginning material of the piece returns, making the form crystal clear. The timpani receives some help from two other members of the percussion section when the snare drum enters at two measures before 13, and the cymbals join in at 13.

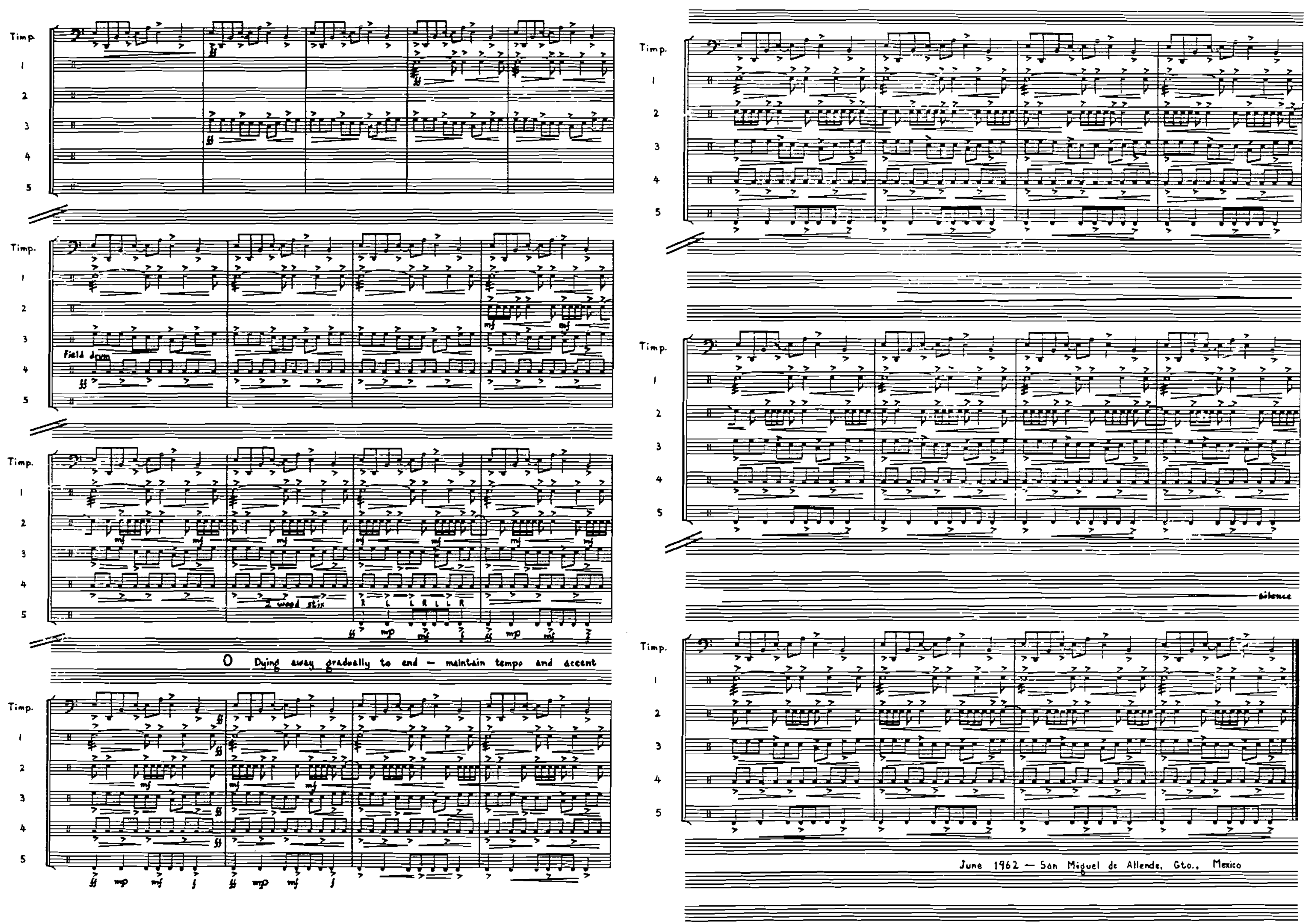
Warren Benson, *Symphony for Drums and Wind Orchestra:* This is an unusually fine example of a sustained climax kept alive by the percussion section only, while the rest of the orchestra cuts off at

[N]. Notice the great effectiveness of the ostinato parts, which have been heard in this movement before. Also, the composer uses variations of the repeated figures just before the climax. Then this material becomes an ostinato at [N]. The device of letting a movement "die out" with percussion is certainly a contemporary one, and this particular lengthy "demise" is most powerful.

Example XIV–22. Benson, *Symphony for Drums and Wind Orchestra*, third movement, 3 before [M] to end




Solo drums to end
N
Pic.
Flutes
Oboes
Eng. Hn.
E♭ Cl.
B♭ Cl.
Bass Cl.
Bsns.
C. Bsn.
Hns.
Trpts.
Tbns.
Str. Bass Tuba
Harp I
Harp II
Piano
Timp.
1
2
3
4
5
L.V.
damper off
cym.
gliss.
47.


Timp.
Field drum
I wood stix
R L L R L L R
O Dying away gradually to end — maintain tempo and accent
silence
June 1962 — San Miguel de Allende, Gto., Mexico

Next, we shall look at an excerpt in which the timpani are used in moving toward the climax, but another instrument is effectively introduced to reinforce the final moment.

One of the most carefully and masterfully planned climaxes occurs at the end of Brahms's *Symphony No. 2*. Very little need be said about it except that Brahms's restraint in using the timpani is rewarded by one of the most thrilling and powerful endings in the symphonic literature. Of course, the excellent brass (trombone, tuba) writing helps, but it is the entrance of the timpani that makes this climax work.

Example XIV–23. Brahms, *Symphony No. 2*, fourth movement, mm. 395–end





Before continuing, we must mention that there are many instances of such climaxes; therefore, the student should study some others. To mention but a few: Wagner's *Overture to Rienzi*, mm. 47–65; W. Schuman's *New England Triptych*, first movement, mm. 235–69; J. Schwantner's *And the Mountains Rising Nowhere*, mm. 91–120. These will serve to demonstrate some of the different ways in which the task of building climaxes with percussion is accomplished.

We have mentioned before that a dramatic moment may come at the very beginning, and that a percussion sound is a great "ear-opener." In this regard, the Prelude to *Carmen* by Bizet was cited. Here are several other effective percussion beginnings:

Example XIV–24. Rossini, Overture to *La Gazza ladra*



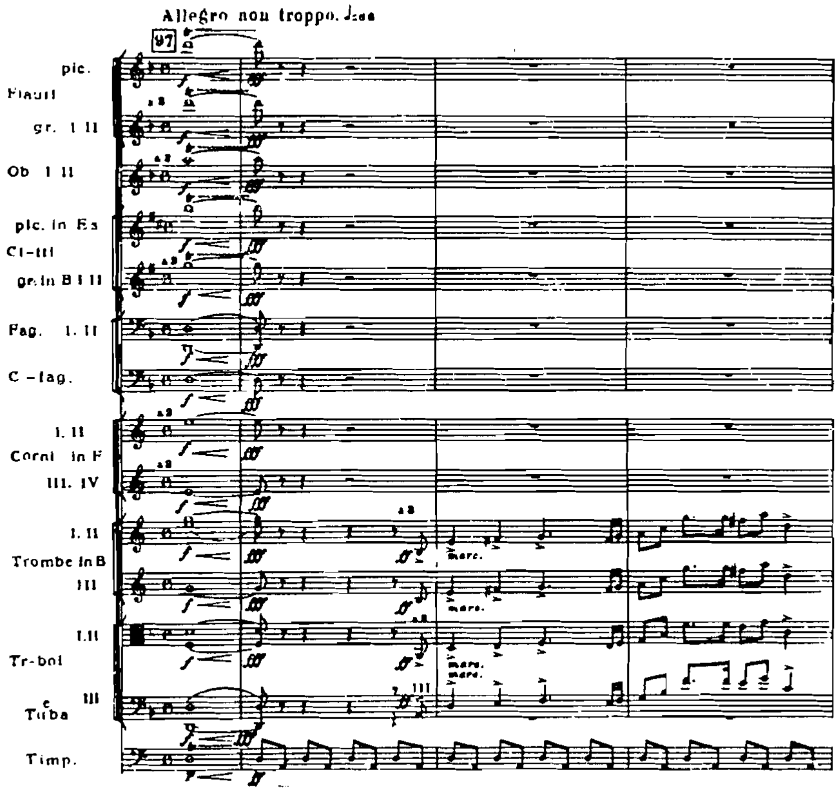
Example XIV–25. Beethoven: *Violin Concerto*, first movement



Example XIV–26. Tchaikovsky, *Symphony No. 4*, fourth movement

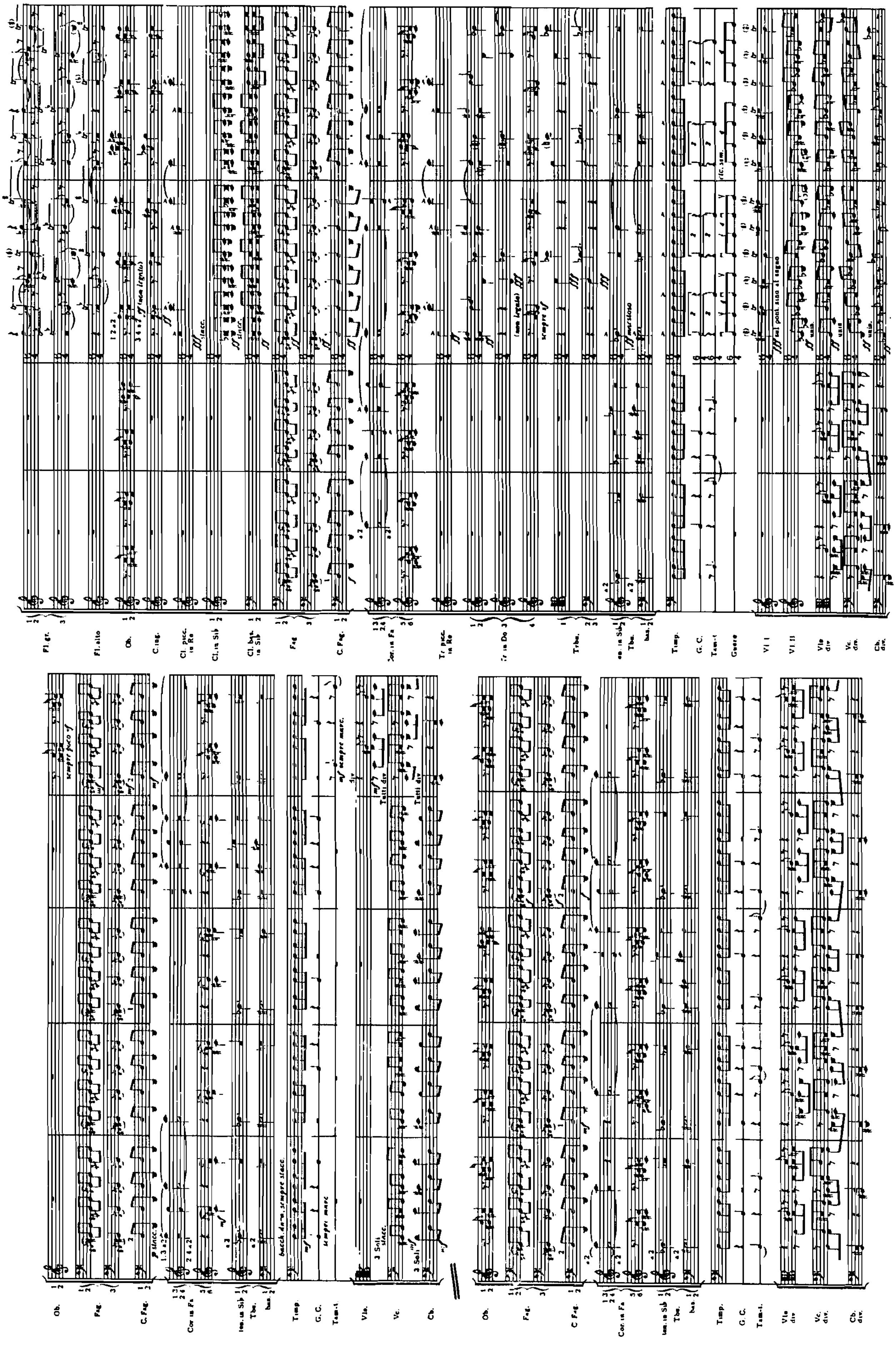


Example XIV–27. Shostakovich: *Symphony No. 5*, fourth movement



Notice that the percussion does not have to be loud to be effective!

Coloring Pitches or Passages



Example XIV–28. Stravinsky, *Le Sacre du printemps*, "Cortège du Sage," mm. 1–14

In the example below, an entire section of a work is colored by timpani, bass drum, and tam-tam to give a heavy "cortège" or procession effect. On the other hand, the ethereal quality at the ending of the following piece is greatly enhanced by the introduction of the antique cymbals (crotales), doubling a "dissonant" note of the chord at first, and then actually playing a solo at the end.

Example XIV–29. Debussy, *Prélude à l'après-midi d'un faune*, mm. 106–10



Leslie Bassett uses three keyboard instruments to color each change of chord in the upper strings.

Example XIV–30. Bassett, *Variations for Orchestra*, 1 before [PP] to 4 after [PP]



The versatility of the percussion section is virtually limitless. However, it is often overused by the inexperienced orchestrator, in an attempt to cover up weak places in the composition. By studying the scores of the masters both past and present, we should be able to learn the virtues of restraint and caution, for even more than the entire brass section, a loud bass drum or cymbal roll can obliterate the entire orchestra, no matter how loud the tutti may be playing.

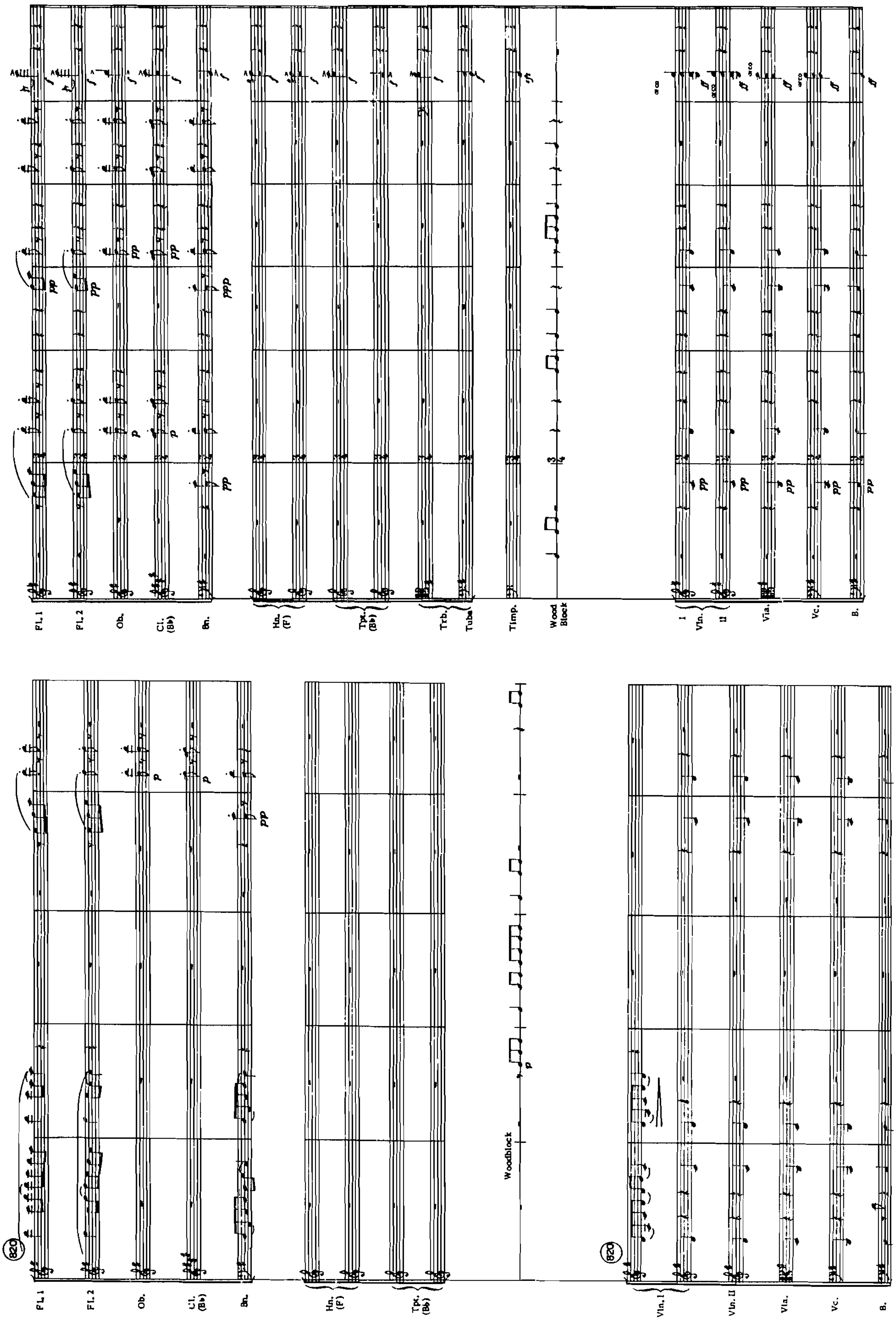
In dealing with any instrument, choir, or section, we must recognize one fundamental, underlying issue: whatever instruments are used must be an organic part of the composition; they must sound inevitable. The *idea* of the composition must govern the selection of any instrument or group of instruments in order to serve the music and present it in the most effective manner possible.

To conclude, let us look at a rather marvelous example of inevitability as far as the percussion section is concerned. In this seven-measure excerpt the timpani are used to emphasize the double bass pizzicato. The snare drum is employed throughout the composition but never again in the manner in which it is played in the last mea-

sure of Example XIV–31. The wood block becomes an integral part of the theme, and because of its sparing use, its importance is heightened, since each time this introductory theme returns, the wood block is used right along with the plucking of the strings. Then at m. 821 its part is expanded, and the wood block solo lends its suport to a most satisfying conclusion. In this little dance variation the entire percussion section is used with the greatest ingenuity and taste.

Example XIV–31. Bernstein, *Fancy Free*, "Danzon," mm. 737–43





Example XIV–32. Bernstein, *Fancy Free*, "Danzon," mm. 820–30

III

ORCHESTRATION

15

Scoring for Orchestra

Scoring for orchestra is thinking for orchestra: knowing at all times what the sound of each instrument is and how it will fare in combination with others. Of course, awareness of the range and limitations of each instrument is essential in one's deliberations when scoring a piece, but what is even more important when dealing with a composite instrument like the orchestra is the character and quality of its components. The timbre, strength, and texture of every segment of each instrument's range becomes crucial when you are creating color combinations that will characterize the music to be played.

The art critic Jacques Maroges once said, "The greatest colorists have always obtained the maximum brilliance and vibration with a minimum of color." This is an important maxim to remember as we study and analyze the use of the entire orchestra. The inexperienced orchestrator may either use the entire body for too long an unrelieved stretch, or utilize such a great variety of different effects that the structure of the work is put in jeopardy by the constant flux of color and texture. Balance of colors and discriminating handling of the musical elements in the orchestration will enhance the clarity of the music and therefore yield the very best orchestral sound. The great orchestators of the past and present realized that one can tire very easily of the tutti sound of the orchestra and that using all the choirs together for too long a time is tedious and monotonous. Therefore, in this chapter we will examine how some of these great masters have used the orchestra for the handling of foreground, middleground, and background material; how to score the most effective tutti; how to handle a purely polyphonic section; and how to deal with newer techniques such as *Klangfarben* orchestration, texture orchestration, and other special devices.

It must be emphasized yet again that the orchestration should support the form of the work; conversely, no matter how imaginative and colorful the orchestration, it cannot save a badly composed piece of music. In the words of Rimsky-Korsakov, "Only that which is well written can be well orchestrated."*

There is no universally accepted system of analyzing the orchestration of a work, except by isolating its major elements and examining their orchestral settings after one has analyzed the structure of the work as a whole. For our purposes, we shall excerpt small sections of a work to see how the composer has handled the material orchestrally, but the student is urged to become thoroughly familiar with the major themes or main gestures, whether melodic, secondary, rhythmic, or harmonic, before attempting to analyze the orchestration.

THE UNISON-OCTAVE TUTTI

Before we begin our discussion of this textural technique, we must clarify the word tutti. This Italian word, when used in connection with the orchestra, generally means the simultaneous use of all of the instruments. In this case the word *all* is relative, for one must not take it literally to mean every single instrument, although in certain instances this may indeed be the case. Perhaps it would be profitable to describe tutti sections in two ways: 1) the *partial tutti*, using most of the instruments at hand; and 2) the *full tutti*, where every instrument is playing simultaneously.

Here are some examples of effective unison tutti. Each one will be analyzed separately so that we may acquire the various skills in handling this very powerful device. Very few actual unison tutti exist because of the range limitations of some of the instruments, but the following are two very successful ones.

All the instruments are in unison, and the composer wisely omits the upper woodwinds because their ranges do not extend down far enough to play the entire passage. Trumpets could have been used, and one may speculate that a contemporary composer would have scored them even if that is not their best register. Notice that the trombones are marked *ppp* so as not to dominate the entire orchestra. Even though the double basses could play most of the notes, they would not contribute significantly to the sound, so the composer has left them out. The performance of the passage on the G-string for the violin is another strengthening device. Here again, a contemporary composer might have used the oboes to emphasize the *sf* in the fifth

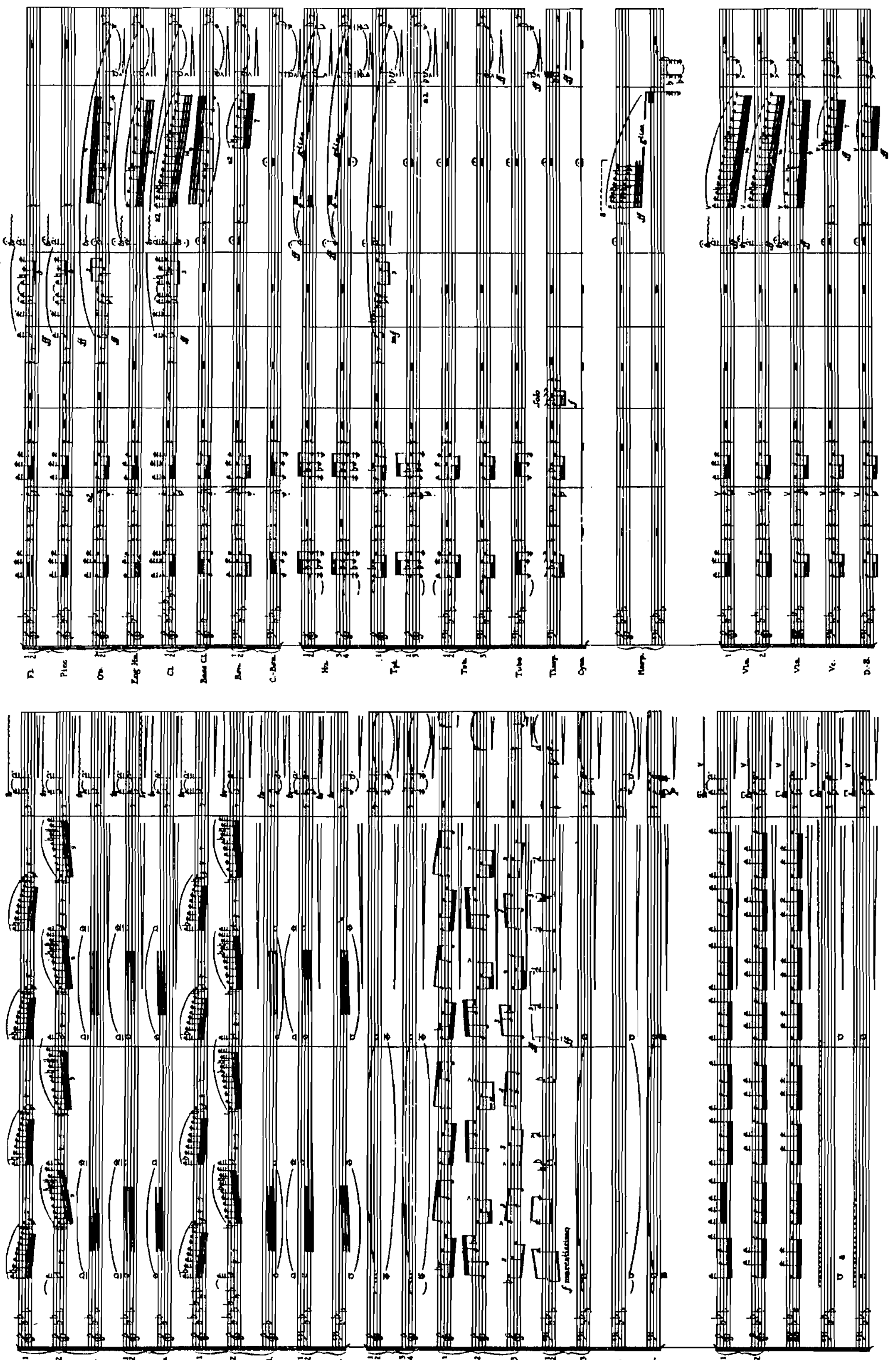
* Preface to *Principles of Orchestration*, trans. Edward Agate (New York: Kalmus, n.d.), p. vii.

Example XV–1. D'Indy, *Istar*, mm. 206–16



full measure and perhaps a muted trumpet to give that accent a special flavor. It is interesting to note the various articulations calculated to give the unison a certain tension. To the smooth slurred winds and horns is added a nonslurred articulated line in the strings and trombones, plus a curious tremolo from the violas. In other words, there is an imaginative undercurrent of activity adding subtle flavor to the otherwise single-minded statement.

Example XV–2. Barber, Symphony No. 1, mm. 128–36



In Example XV–2, we have a different kind of tutti unison (actually octaves) occurring at the climax (end) of the first section of the symphony. Barber orchestrates a crescendo by adding the brass instruments and timpani in octaves on a single pitch, and then the germinal idea of the section is played in a multi-octave spread. The timpani repeats the idea constituted of different colors to still another unison at 15, followed by an orchestral glissando. Barber very subtly enlarges the doubling slightly in every measure in order to exploit varied timbres each time the little germ motive is played. Notice four more details:

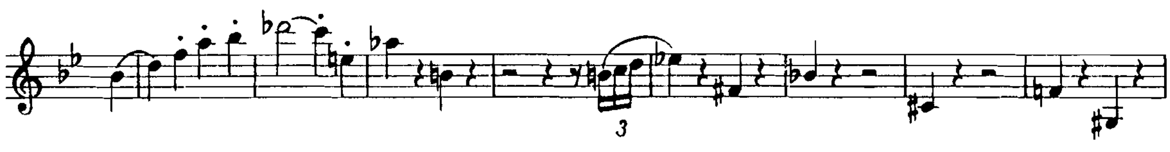
1. Barber does not write octave skips from m. 129 to m. 130 in the horns, trombones, or tuba, perhaps because that would make the gesture too heavy and pompous and risk losing its brittle quality.
2. He wisely cuts out the piccolo and flutes before the glissando so they won't be forced to drop out before the last notes.
3. The trombones and tuba are also omitted in m. 136, because that would make the glissando too heavy and deemphasize the high D, which is so poignantly supported by the high horns.
4. The entrance of Trombone III, tuba, and timpani on the low B♭ really reinforces the finality of the phrase.

Example XV–3. Mozart: *Symphony No. 40*, fourth movement, mm. 125–32



The orchestral unison spread over several octaves has always been popular and has been used very frequently either to introduce a new idea, summarize an old one, or state a major melody or gesture before it is contrapuntally developed. The latter is the case here, and

Mozart uses a partial tutti since the horns could not play many of the notes. What is most interesting about the spacing of this octave tutti is its variety. At first, Violins I and II and the flute plus the two oboes play in unison, while the octave immediately below is rather sparsely scored with the violas and clarinets only; the octave below that is more heavily scored for the cellos and both bassoons, supported yet an octave lower by the double basses. Notice, however, that from m. 128 on, Mozart divides the orchestra differently; from the heavy scoring in the middle register, one suspects that he wants the listener to understand the theme to be:



with the flute and oboe added simply for sheen and brilliance. By this subtle turn in the scoring, we can certainly learn a great deal about orchestration as the means for clarifying one's intentions. If, for instance, Mozart had kept the unison of the flute and the violins, he would have had to drop the flute out for the final note of the passage, and it would have added nothing to the heavy string scoring. Similarly, the oboes would have had to be dropped since they cannot play the last note, although they would have added a raucous quality to the low C♯. They fill out the space much better exactly where they are written and the flute is not left alone in its upper reaches. In other words, the composer wants every note in this passage played effectively by every instrument that he uses, yet wants his gesture to sound as written in the example above; therefore, he chose this distribution of pitches and octaves in the instruments.

In Example XV–4, we see a full orchestral tutti beset with problems of instrumental limitations or practices characteristic of the trumpets, horns, flutes, and violins of that time. This most powerful passage probably would have been scored differently (not *better*, mind you) today because a piccolo could have played the upper-octave D anacrusis so that the all-important falling fourth would be emphasized. The first violins would probably have been placed an octave higher, and for that matter, the first flute might have been asked to play the top D, which is possible on today's instruments. Of course, the trumpets and all four horns would be able to perform the entire passage in octaves with the rest of the orchestra. One may even say that five timpani could be assigned to play the entire passage with the tutti. Beethoven did not have most of these options, yet wrote a remarkable climax. The limitations of the instruments are converted into assets, for the emphasis on the D and the A provided by the horns (III and IV), trumpets, and timpani give an open feeling to the

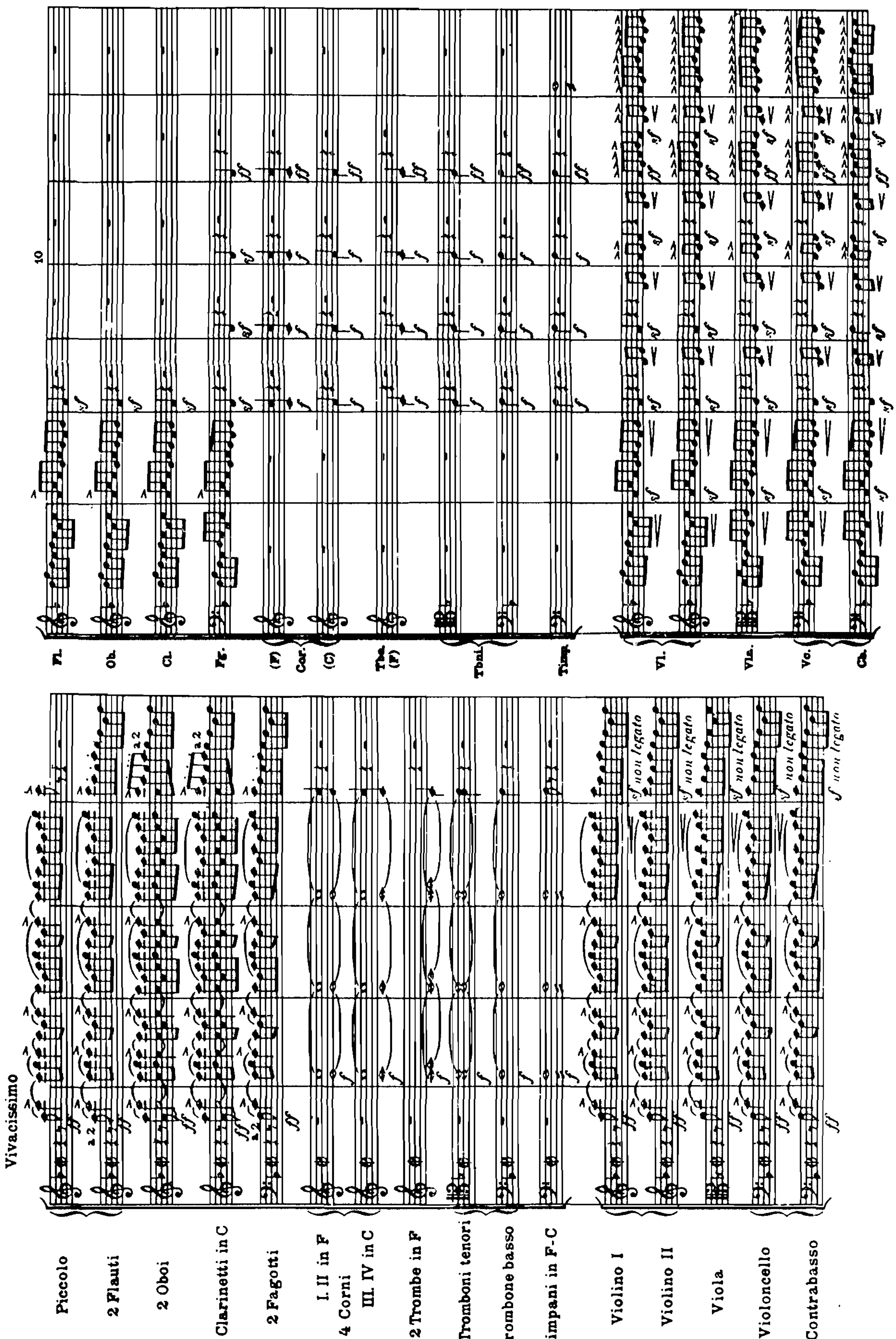
Example XV–4. Beethoven, *Symphony No. 9*, first movement, mm. 16–21



whole statement and lend even greater power to the final D. Notice some of the excellent doubling and nondoubling. It is significant that Beethoven superimposes an octave on the high octave of the violins, oboes, and clarinets, with only two flutes. This is real contemporary orchestral thinking, for this high octave in the flute is so piercing it need not be doubled by any other instrument to cut through.

Study every instrumental line separately to ascertain exactly why it deviates (or has to deviate) from the melody as played by the strings, the bassoons, first oboe, first clarinet, and second horn, and you will unlock many of the reasons for the various uses of these instruments in Beethoven's time. Beethoven teaches us some most valuable lessons concerning strengths and weaknesses in certain

Example XV–5. Smetana, Overture to *The Bartered Bride*, mm. 1–12



registers of these instruments, such as the doubling of the flutes from m. 18 on, the voicing of the oboes and clarinets (the clarinets could certainly have remained in octaves, but apparently the composer did not wish to strengthen that octave), the limitation of the B♭ horn in this key, and so on.

The final example in the study of unison or octave tutti is somewhat different from the others and a good bridge to the next texture we will discuss—melody and accompaniment—since the sustained chords act like an accompaniment to the lively melodic figure. Sustained notes or chords are the adhesive that provides cohesion in a tutti passage. Even without the sustaining brass, the woodwinds and strings would sound spritely and exuberant, but the bright brass sound enhances those qualities. The atmosphere is rendered even more like a celebration, and a certain "roundness" of tone is added by the sustaining brass. What would a contemporary composer have done? Well, we could speculate that he might have scored the trumpets and horns in unison and octaves with the woodwinds and strings. But this would have added too much weight to the eighth notes and taken the lightness out of the passage. He could have simply removed the sustaining notes and left out the brass altogether. This would have given the passage a more brittle quality. Finally, he might have added xylophone to give added "ping" to the fast notes; however, that certainly would be out of style for Smetana's orchestra of 1866. Smetana's solution is perfect, for it gives the very agile instruments an opportunity to show off in their best registers. In addition, the harmonic implications of a run realized by sustaining brass, makes for a thrilling opening of the work.

FOREGROUND AND BACKGROUND

It is more accurate to identify this texture by a more abstract label than "melody and accompaniment," because there will be so many occasions when just two elements are present, neither being exactly melody or accompaniment, but two separate and distinct musical ideas. The simplest example is, of course, a melodic foreground with a strictly harmonic background. (See Example XV–6.)

This is the most obvious kind of scoring and is very effective. The melody is introduced in the clarinet alone and after its introduction flows right into a tune with string accompaniment. It should be mentioned forthwith that the most striking accompanying color is usually in contrast to that of the solo (melody) instrument, although there are many instances where successful accompaniments are played by instruments that are the same or similar to the solo carrier. The pizzicato adds to the contrast and, by comparison,

Example XV–6. Tchaikovsky, *Francesca da Rimini*, mm. 325–49





makes the clarinet sound even warmer. The *con sordino* designation means little here, for pizzicato is not affected very much by mutes. The mutes are put on for the next passage, which is the continuation of the clarinet melody by the violins (in octaves), accompanied by sustained lower strings, bassoon, and timpani, a wonderful contrast to the clarinet presentation. Timing and placement or assignment of color should be mentioned in connection with this example. An anacrusis or a rest before a certain color enters are two excellent ways of introducing new elements and making sure they are clearly perceived. (This will be especially true in polyphonic textures, discussed later on.) In the Tchaikovsky example, the introduction of the clarinet all by itself is a bit extreme, but it does illustrate this point well.

There are thousands of examples of foreground–background orchestrations, many of which have been mentioned previously when discussing the choirs separately. Two more, which involve much of the entire orchestra, are given on pp. 470 and 471.

In Example XV–7, the four horns are beautifully accompanied by the strings. The string texture is both arpeggiated in the first and second violins and sustained in the lower strings. Notice that here the accompaniment begins first, and the entrance of the two horns sounds very fresh.

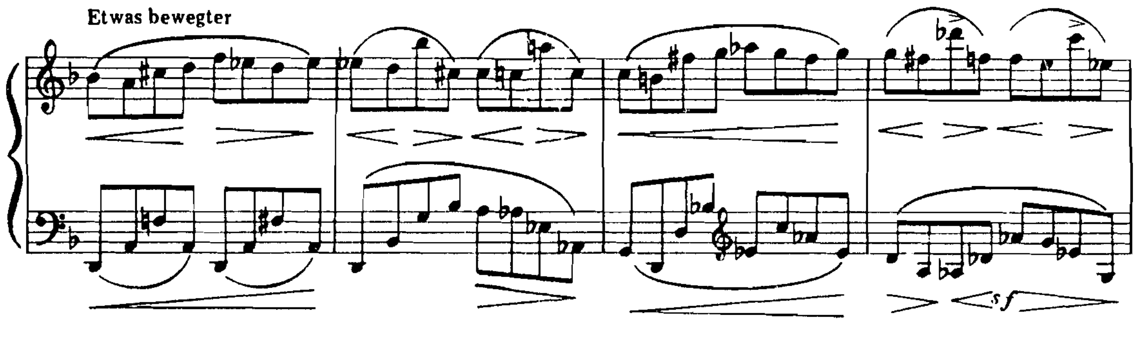
In order to understand the complex scoring of the incredible orchestral thinking in Example XV–8, we must first look at a piano version of the music. Notice there are only two components: an eighth-

Example XV–7. Weber, Overture to *Der Freischütz*, mm. 1–18



Example XV–8. Mahler, *Kindertotenlieder*, "Nun will die Sonn'," mm. 58–61

a. Piano Version



b. Orchestral Version



note foreground in the right hand and an eighth-note background in the left hand. This is a kind of first-species counterpoint: two distinct parts, note against note. A third element might possibly be an implied D pedal; at least a pianist playing these few measures would pedal as if there were. Mahler indeed does utilize a soft pedal note in the fourth horn and at the beginning in the bass clarinet. The other two parts are distributed among the instruments in chamber-music fashion. There are no two instruments with identical parts for more than a few notes. Almost every pitch is colored differently; one may even say that this foreshadows the practice of *Klangfarben* orchestration, made popular by the expressionists. (We shall learn more about that later on in this chapter.) One further observation which is important in our contemporary thinking for orchestra: while from Wagner and Mahler to the present time composers have availed themselves of the huge orchestral forces developed through-

out the nineteenth century, composers today often avoid writing for a large orchestra, or if they do, emphasize the importance of single instruments and their characteristic sounds rather than the "fat" combinations favored by earlier masters. This must not be considered a value judgment; as a matter of fact, some people believe that this chamber treatment of the large orchestra is a trend away from effective orchestration. Both points of view are valid, provided the orchestra is used with great imagination and skill; if the music is good, the results either way will be most satisfying.

Study this Mahler excerpt very carefully, and make a list of the doublings of each gesture—or even each note—so that these composite sounds will be well ingrained into the ear for your own eventual use.

HOMOPHONIC TEXTURE

Let us divide this section into two parts:

1. chords;
2. harmonic (homophonic) writing, in which one element is given to the entire orchestra to play together. In connection with this topic, we shall discuss voice leading as well as doubling.

Chords for Full Orchestra

We have already discussed the problem of spacing chords for each individual choir; now let us examine some successful orchestral chordal scoring.

It would be best to set down some overriding considerations:

1. The melody notes should be more prominent than the harmony notes.
2. Care must be taken to assign pitches to the instruments in their best registral positions so that the notes may be performed at the desired dynamic.
3. When considering doubling notes, try to find instruments that have an acoustic affinity for one another. This is especially important when doubling at pitch.

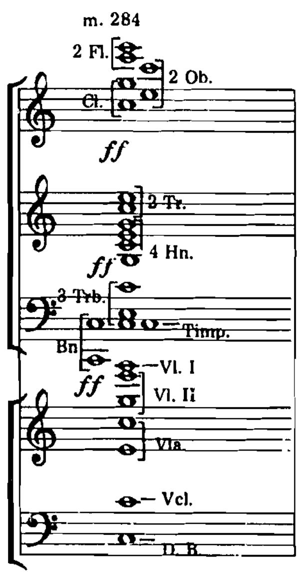
We have already spoken of the three major spacings of chords—juxtaposed (or superimposed), interlocked, and enclosed. Usually these techniques are mixed when we deal with a full orchestra. Here are some examples:

Example XV–9. Beethoven, *Missa Solemnis*, chords from m. 1 and m. 21



The tonic chord in the first measure of the work emphasizes the tonic note D most prominently; it is a rather open sound, with all the strings plus the trumpets, three horns, and timpani on D, and both flutes sounding the higher octave. Only the remaining woodwinds play the chord tones, as if they were "realizing" the first few overtones of the D fundamental. The chord in m. 21, on the other hand, is a full chord in which all the sections play all the notes in the tonic chord. The dynamic after a rest is a sudden *forte,* and the chorus enters, supported by the organ to make the sound quite heavy and full. Notice that in the first doubling, the flutes were given the octave above the first violins, while in the big chord the first flute doubles the first violin at pitch, and the second flute plays the A above the staff alone. It is a most effective spacing.

Example XV–10. Weber, Overture to *Der Freischütz,* m. 284



This is the climactic chord of the main section of the overture. It is a brilliant and crystal-clear tutti chord, with the strings and timpani adding power by their tremolo and roll respectively. It is important to study the exact makeup of the chord. The strings are simply "stacked" or superimposed from the lowest C to the high G. The bassoons and the third trombone take care of the octaves below the double basses. The brasses are also juxtaposed, and only the oboes and clarinets are interlocked. Weber must have felt that the second oboe doubled by the first trumpet is a more sympathetic doubling acoustically than a clarinet-trumpet combination. It is also interesting to note which instruments are not doubled at pitch, since the composer obviously felt that these were in such a good registral position that they would be more effective alone. They are: Oboe I, Horns I and IV, Trombone II and Bassoon II. Consider this chord carefully, and remember its spacing when a brilliant chord is in order.

Example XV–11. Schumann, *Symphony No. 1*, first movement, mm. 3–4



It is important to study this chordal progression for two reasons: first, to ascertain how the composer emphasizes the melody, and second, to observe how he handles the voice leading of the harmonic progression. Schumann uses double- and triple-stops to obtain a sweeping sound in the strings *non divisi*. This adds to the ringing effect of these chords. All the string notes are doubled in the juxtaposed woodwinds, while the horns and trumpets, both in B♭, play the only notes they can in this situation—the "horn fifths."

Example XV–12



The voice leading of the chords is absolutely "according to the book" and should be studied carefully. All sevenths (E♭) resolve downward; all dominant notes (F) remain as common tones, except those involved in the "horn fifths." All pitches are doubled at least once, and it is interesting that Schumann holds back on the use of trombones and timpani in order to build an even heavier chord in the next phrase.

Example XV–13. Brahms, *Symphony No. 3*, first movement, final chord



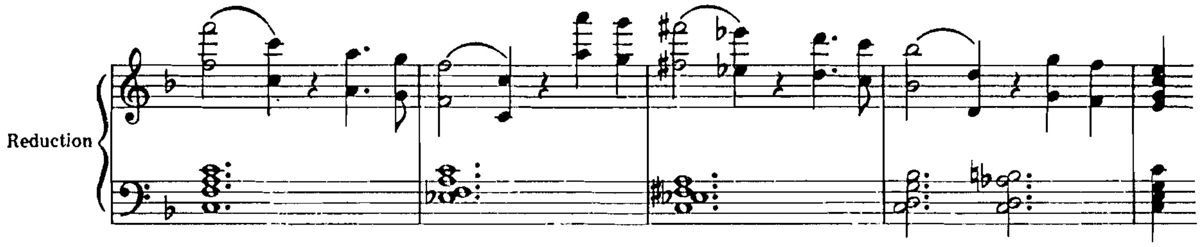
We must label this a "dangerous" chord, because the articulation and dynamic are difficult to achieve. Many Romantic composers love to end movements in this way, and one must expect the flutes to overpower the structure because it is simply very difficult to play *piano* that high. This chord always sounds louder than it should, although it is a beautifully luminous sound. Actually, it would be easier to control if the strings had the top octave doubled by the winds at the octave below, but that would have been impossible in this situation.* The spacing of the chord as written is certainly beau-

*The flute was already holding the top pitch, and the strings were otherwise involved.

tiful, and the stacking effect gives it a very warm hue because all the instruments are in their mellow range. Notice the doubling of the first and second trombones with the violas; this emphasis, and the low notes of the strings with the first and second violins doubled an octave higher by the winds, contribute to the separation of high and low perceived by the ear.

Example XV–14. Brahms, *Symphony No. 3*, first movement, mm. 183–87

a. Reduction

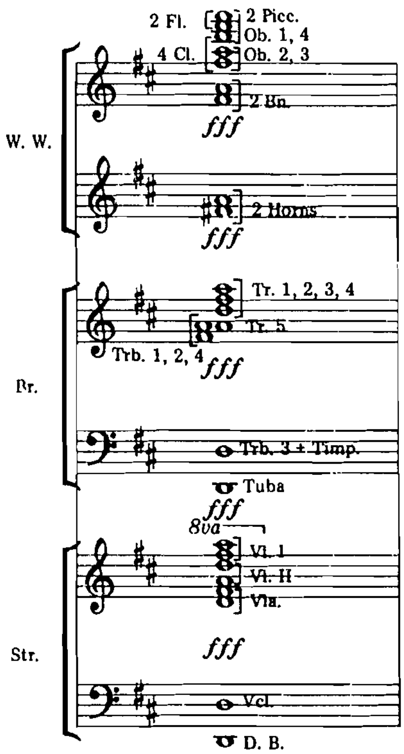


b. Full Score



Here are a reduction and full score of this passage. It is advisable for the student to make a reduction of the wind and brass chords as well, in order to find out exactly what is doubled and how the voice leading operates. This is certainly brilliant scoring, but it neither overwhelms nor overshadows the tune of the first and second violins; they are in their best register, and the high flutes help by emphasizing the first melody note in each measure. Notice that each chord is fully represented in all the choirs and in every octave.

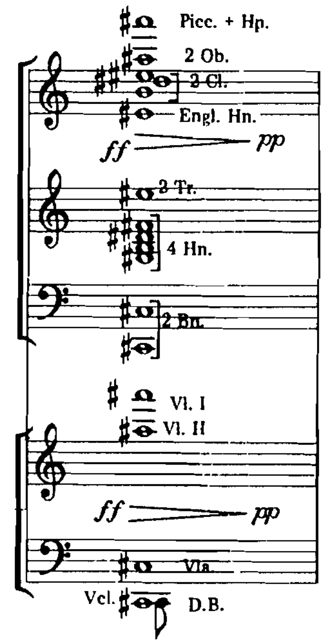
Example XV–15. Mahler, *Symphony No. 1*, fourth movement, mm. 123–27



A most brilliant sound aided by string tremolos, rolls in the timpani and triangle, plus a cymbal crash. It is important to notice that all the upper octaves are completely filled in; only the lowest octave, played by the cellos, double basses, tuba, third trombone, and timpani, is left bare. The high brass doubled an octave higher by both violins and upper wind makes this an overwhelming chordal structure, with one section completely juxtaposed upon the other.

It is imperative to study a chord that is "under control," meaning that it is articulated as a *fortissimo* sound and then must diminuendo to *pianissimo*. The composer, therefore, has to distribute the pitches among those instruments that can easily control the notes and accomplish the dynamic requirement. In the next example, Debussy does so brilliantly. The two highest notes (A♯) are assigned to the first violin and the piccolo. The violins, of course, are able to play softly on any note high or low, while the piccolo is in its least

Example XV–16. Debussy, *La Mer,* last measure



exposed register and can keep this note, written under perfect control. The harp simply provides a loud or soft "ping" for the top pitches. Again, there is a big gap between the low C♯ and the rest of the chord, which is juxtaposed in every choir. The melody note (E♯) in the two trumpets comes out brilliantly in this register; and it is doubled by the two oboes and at the octave by the English horn. This E♯ and the high A♯ are the only notes doubled at pitch, so that all the other chord tones are much softer and retain their own individual colors.

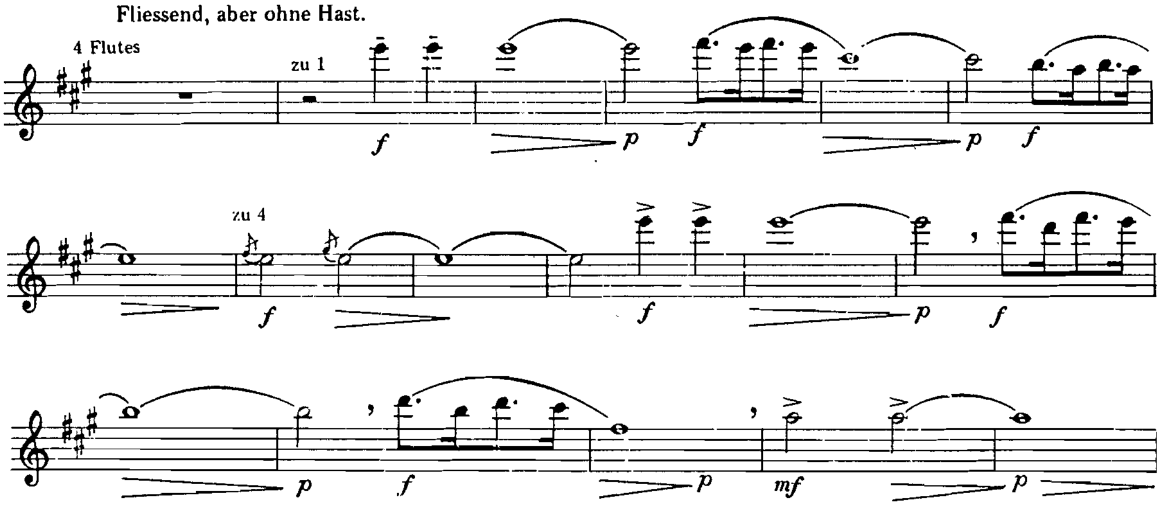
Before we proceed to homophonic passages from the literature, let us summarize briefly the whole question of doubling. There are basically two reasons for doubling:

1. for dynamic tonal strength or power;
2. for subtle coloristic tonal effects.

It must not be forgotten that doublings at pitch usually result in the loss of the individual color characteristics of both instruments. Further, sustained doublings tire the ear. Often octave doublings give much clearer and more brilliant results, especially if the purpose of the doubling is for tonal power.

Unison doubling or blending of the same instrument gives a peculiar weight to the tone, but because two, three, or four like instruments cannot always play in tune with each other, many of the upper overtones are cut to give a "flatness" to the strength of the pitches. Many composers consciously seek this effect, as in this example from Mahler's *Fourth Symphony:*

Example XV–17. Mahler, *Symphony No. 4,* first movement, mm. 125–41



Here four flutes play a "shrieking" melody that is both heavy and powerful (also always slightly but beautifully out of tune). This passage would be just as loud with one flute playing it, but that would be too clear and transparent for Mahler's purpose.

How and what to double is always a matter of personal preference, but it must be a conscious matter, in which all these facts are taken into consideration. Beethoven, for instance, most often uses octave doublings for added power. Mozart, Mendelssohn, Debussy, and Ravel prefer unmixed pure sounds for melodies, but they also use octave doublings and sometimes very subtle blends. Rimsky-Korsakov favors tone mixings and big combinations of unison doublings. All these must be studied so that the orchestrator can make choices after having examined the various combinatorial possibilities in the best scores of the past and present. To show one excellent example of doublings for the sake of power, consider the example from Tchaikovsky's *Romeo and Juliet* on p. 480. The trumpets play a2 at pitch, while the accompanying chords are all doubled throughout the orchestra for a most powerful "punctuation" effect. Here the power of the whole chord is the issue, not its tone color: brilliance versus subtlety.

We shall, of course, continue to examine this problem, but the considerations discussed above should be kept in mind at all times so that the choices concerning doubling can be made from a position of knowledge, experience, and strength.

Example XV–18. Tchaikovsky, *Romeo and Juliet*, mm. 334–37



Examples of Homophonic Texture

Example XV–19. Schubert, *Symphony No. 8*, first movement, mm. 170–76



This very simple example on p. 481 begins as a unison (octaves) over a dominant and tonic pedal. After m. 173, the melody is carried on by the strings, while the rest of the orchestra builds two chords. The transition from unison to a thicker harmony is facilitated by the sustained tonic pitches in the brass and the dominant pitch in the timpani. Notice the wide separation between the flutes and the strings. Notice, too, the reluctance of the strings to break into harmony. This color division makes it much easier for the ear to separate melody from the harmony (background from foreground) and the result is a most successfully scored passage.

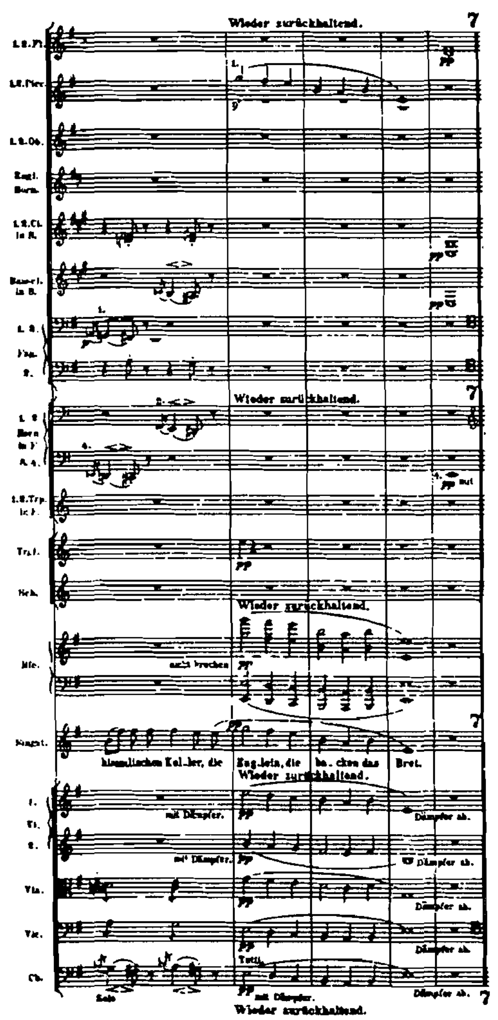
The ear is able to separate two ideas presented simultaneously if they are scored with opposing timbres and differing designs. This is an important principle to keep in mind for emphasized clarity in orchestration whenever a variety of ideas is present at any given time.

Example XV–20. Mahler, *Symphony No. 4*, fourth movement, mm. 36–41

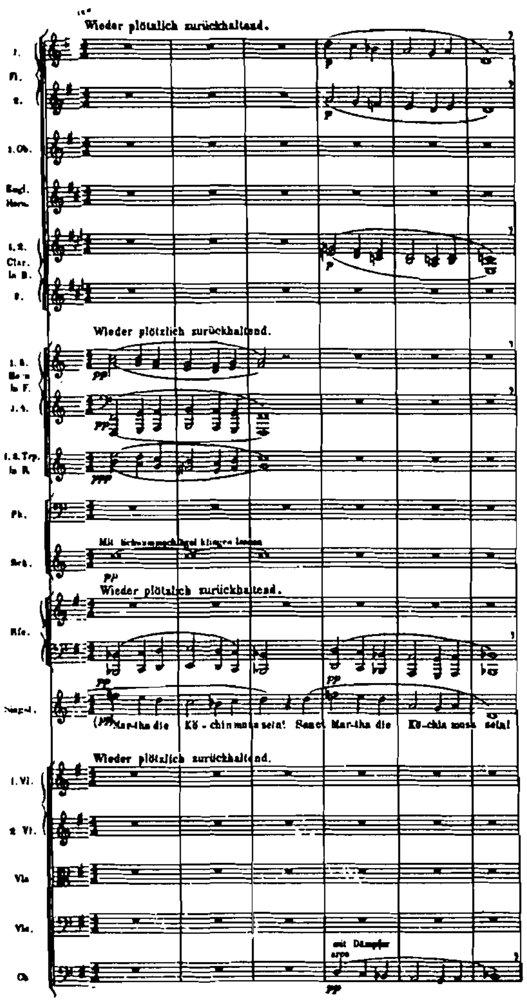


The exquisite passage which recurs three times during the course of the fourth movement of Mahler's *Symphony No. 4* is scored very differently each time it appears in partial tutti. The "heavenly" quality is effected by modern organum chords, parallel-motion triads with contrary or similar motion in the bass. Examine the highly successful combinations of instruments in each of the three scorings. Mm. 36–39: The strings are reserved for the final open fifth sound, while the harmony is given to the flutes, horns, and harp to play chords under the singer's line. Notice that the third horn doubles the singer's pitches an octave below. Mm. 72–75: This version features the strings as the main accompanist, and it is the softest scoring with a beautiful assist from the piccolo. The harp writing is interesting, first in thirds, then in octaves, to add to the smooth unison writing in mm. 73–74. The softness of this version is aided by a full D-major chord in the fourth measure rather than the stark open fifth sound of

Example XV–21. Mahler, *Symphony No. 4*, fourth movement, mm. 72–75



Example XV–22. Mahler, *Symphony No. 4*, fourth movement, mm. 106–11



the previous version. Mm. 106–11: The final repetition of the phrase is extended and colored in two very distinct ways: first, by very soft brasses with harp; then by a lovely, rather rare combination; flutes, clarinets, and muted double basses, with the harp acting as the constant. This kind of partial tutti, colored differently each time, illustrates an essential aspect of great orchestral thinking: Even though great color variety is provided, the recognizable texture and similar chord structure that mark the passage prevail to give a great sense of unity to the form of the movement.

Example XV–23. Wagner, Prelude to *Die Meistersinger*, mm. 1–9



The noble beginning of this Prelude illustrates the technique whereby a dark yet loud and majestic color is created through vital semi-independent parts for the different instruments. The first chord is immediately noteworthy. The strings play only a big chord, while

the melody is given to the trumpets, doubled by their best "affinity instruments," two oboes and two clarinets at pitch. This certainly creates the heavy, dark color often associated with band music. Curiously enough, Wagner does not continue the melody in this combination but has the violins take over the tune. One may speculate that possibly he did not trust the valve trumpets to carry on the stately melody, but it is much more likely that he did not want the first statement to be quite so climactic, for he does give the entire theme to the trumpets later on in the work. The violins (first and second) add a grandeur to the initial statement, and their *non divisi* double stops add power to the sound, while the oboe and clarinet doubling gives them a sharper edge. The inner harmony is filled out by the two bassoons, four horns, and the first two trombones, with a bit of assistance from the violas. The color resulting from this combination is very warm and most appropriate to the sombre, organlike beginning. A strong bass line is entrusted to a very powerful combination: third trombone, tuba, cellos, and basses in octaves. This is, all told, beautifully balanced homophonic phrase. It is important to note that the trumpet, which might alter the balance once it has stopped playing the melody, is given a secondary role in the harmonic structure in a register where it cannot disturb the quality of the established hue. Since this is such a popular work, the student should be able to study a bit more of the score to see how Wagner holds back "the highs" so cleverly and how they lighten the entire atmosphere and build the crescendo as upper octaves gradually double the violins after m. 18.

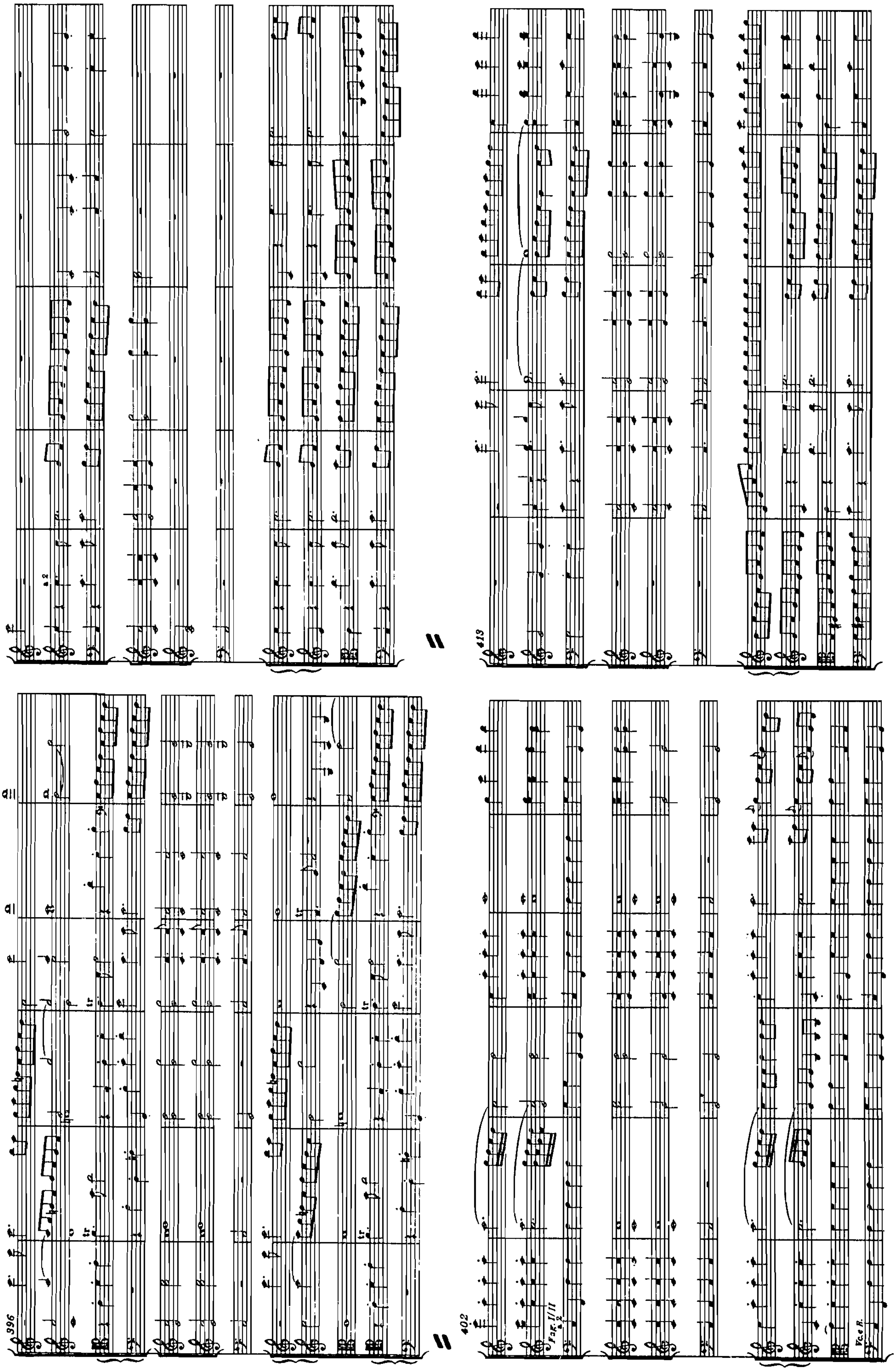
POLYPHONIC TEXTURE, OR FOREGROUND–MIDDLEGROUND–BACKGROUND DISTRIBUTION

We have already discussed the handling of polyphonic textures in the individual choirs; we have further observed some superb scoring of three diverse elements in the second movement of Beethoven's *Seventh Symphony*. This skill is difficult to master, and it is hoped that the next few examples will provide insight into some of the most successful solutions by masters of the orchestral repertoire. We shall not spend too much time on fugal writing, because it is the most obvious type of polyphony and is becoming less and less useful nowadays. While we will not ignore this genre, we will concentrate more on handling three or more important elements sounding simultaneously to create sophisticated polyphonic situations.

The end of the *Jupiter Symphony* is one of the monumental examples of polyphonic writing in the history of music. This is a quintuple fugue where each subject is exposed by itself and then utilized

Example XV–24. Mozart, Symphony No. 41, "Jupiter," fourth movement, mm. 368–424.




396
402
413
a 2
Fag. I/II a 2
Vc. e B.



throughout the development section in various combinations with the other themes or elements. The reason for calling them elements is to emphasize that they are all rather short fragments, not long subjects as are found in many (not all, of course) Baroque fugues. Here are the five themes (or elements) that make up the melodic material of this finale:

Example XV–25



We notice immediately that each of the five gestures has its own characteristic rhythmic makeup. In other words, each is recognizable separately. The first theme is a kind of *cantus firmus* which is at the same time a unifying element for the entire symphony, since it appears in the first as well as the third movement. The others all have their own profiles which make them distinct. This is essential in a multi-element orchestral texture if one wants the listener to fol-

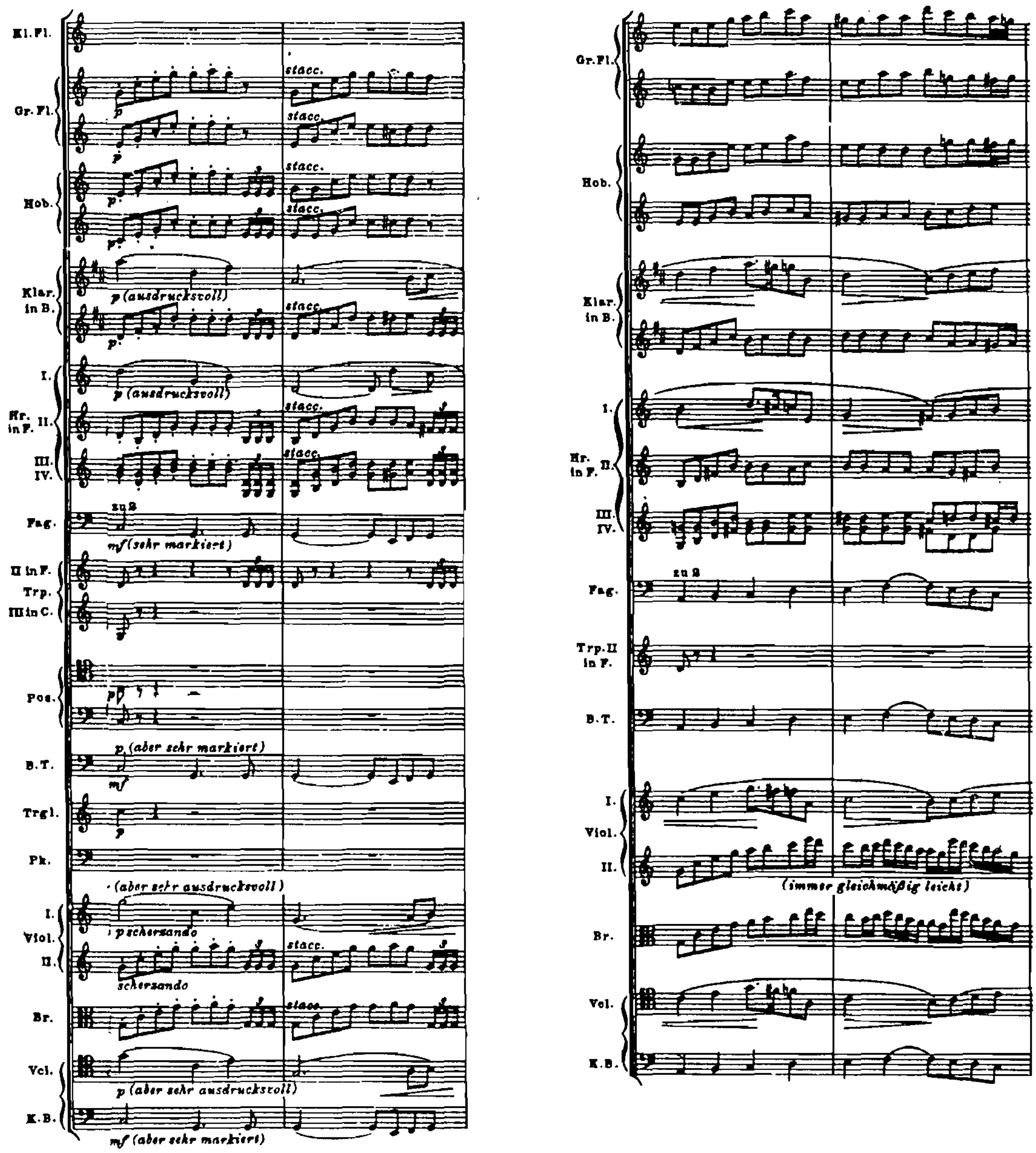
low the different gestures. Of course, the individual elements also work together in quintuple counterpoint, quite a feat in itself.

Now let us go to the score. From mm. 372 to 388, Mozart doubles only the *cantus firmus*–type first theme, while the other tunes are brought in, played by different sections of the string choir. It is important to note that each rendition of the first theme is colored somewhat differently and supported by one member of the string choir: (a) bassoons, horns, cellos; (b) flute, oboes, violas; (c) flute, oboes, second violins; (d) flute, oboes, first violin. As the texture thickens, the third theme is strengthened by coupling the violas and second violins in sixths in mm. 383–84, in mm. 387–88, and by adding the preliminary four notes to the theme. These, of course, add weight to the harmony. Mozart and many of his countemporaries were not prone to write independent double-bass parts, but in this contrapuntal texture the double bass is a completely independent member of the ensemble. Once the web of counterpoint becomes truly involved, combining the first four elements, Mozart shows us an important technique, namely, to keep an established color intact long enough to carry out its assignment. The listener must not be overburdened with shifting colors in which the main musical ideas may be lost and secondary color considerations become the point of focus. From m. 389 to m. 400 the following colors are constant:

1. first violin doubled by flute at pitch (third theme);
2. second violin doubled by first oboe at pitch (third, fourth, then second theme);
3. violas doubled by second oboe at pitch (fourth, second, then first theme);
4. cellos doubled by first bassoon at pitch (second, first, then third theme);
5. double basses doubled by second bassoon at the octave (first, third, then fourth theme);
6. horns, trumpets, and timpani providing the cohesive tonic-dominant, nonthematic pedal notes.

Suddenly at m. 400, a tremendous climax, which has been building, shakes up the colors for four measures and introduces the fifth element for the final part of the coda. This closeup section is mostly harmonic, but the fourth element is emphasized when it is played three times in its entirety (both in unison and harmonized). In all the doubling here, Mozart's primary concern is tonal power; each theme must be heard at good strength. He relies on the rhythmic-melodic characteristics of each element to differentiate it clearly, assigning each a strong and sympathetic color combination to aid this purpose.

Example XV–26. Wagner, Prelude to *Die Meistersinger*, mm. 158–61



This is an example of three distinct musical elements or themes most successfully combined. They are so clearly perceived because they are assigned to very distinctive color combinations. The two main elements are the bass and the first violin tunes; the arpeggio theme is the third, but less "thematic" element. Of course, anything that outlines a chord is important, since the first or main theme is built on one, so the arpeggiated gesture takes on significance in that way also. As in the Mozart example, Wagner's three elements are rhythmically very independent, and have been exposed separately before this combination occurs. This fact, added to the very clever color variance among the three elements, gives clarity and great excitement to this exquisite passage.

First theme: double basses, tuba, two bassoons (double basses an octave lower)

Second theme: Violin I, Clarinet I doubled at pitch; octave-lower cellos plus Horn I doubled at pitch

Third theme (or counterpoint): made up of three harmonic voices doubled at the octave, Violin II and viola, plus two flutes, two oboes, Clarinet II, Horns II, III, IV, and occasionally the Trumpet II

Two more important observations:

1. The color of each theme is made up of a combination of at least one string, one woodwind, and one brass instrument.
2. One of the factors that differentiates each theme besides its individual rhythmic characteristics is its specific and unique articulation.

The next few examples deal with works in which three or more elements not necessarily of equal thematic importance are combined. These instances of foreground, middleground, and background combinations occur frequently in orchestral literature.

Example XV–27. Rimsky-Korsakov, *Scheherazade,* fourth movement, mm. 482–93





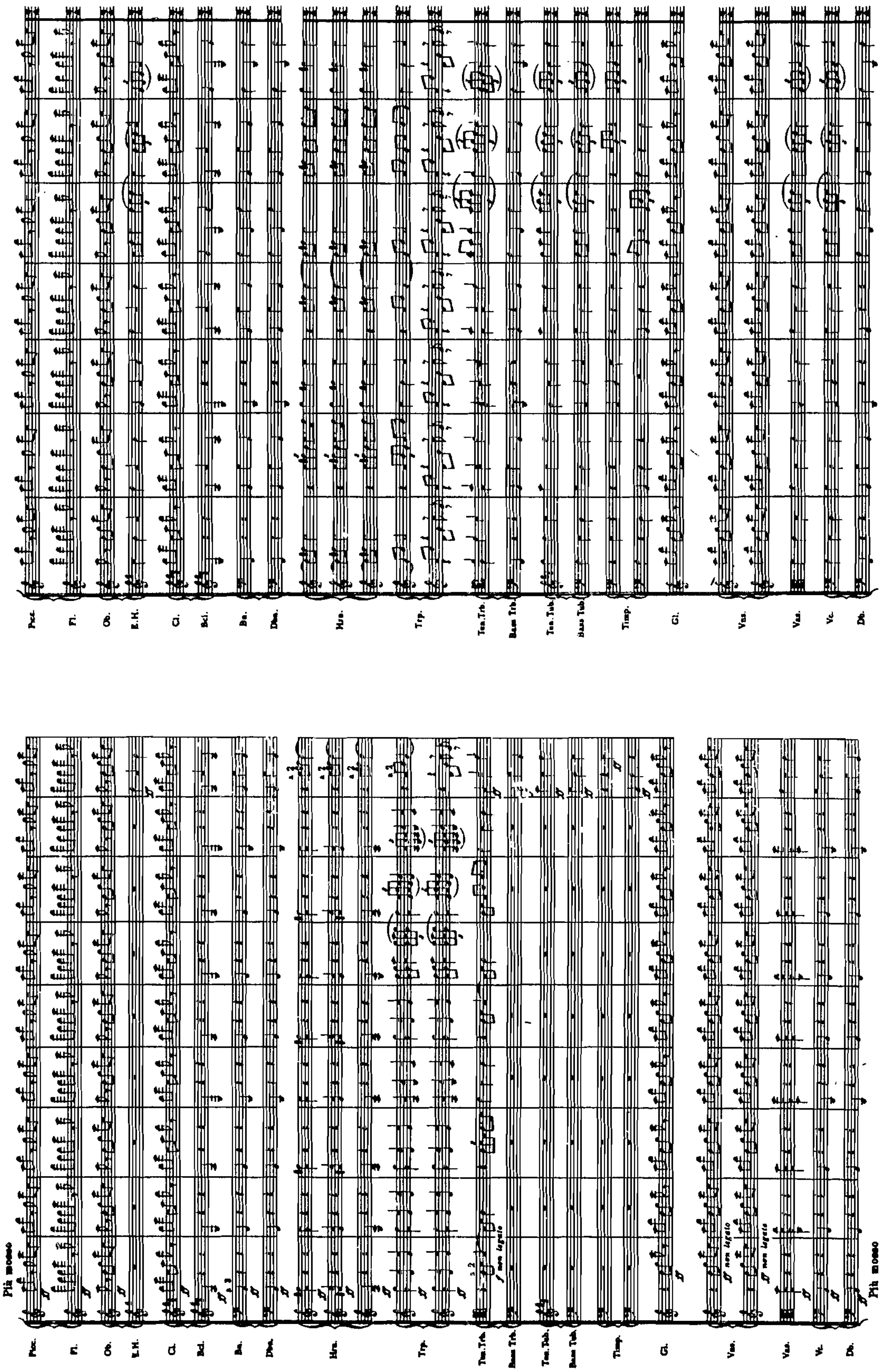
In Example XV–27, a most poignant combination of cello in its highest, most piercing register, doubled at pitch by the first two horns and again by the two clarinets an octave higher, plays the main theme. The clarinets are also in an excellent register to be heard most distinctly.

The middleground, which we might call the "dance figure" accompaniment, is provided by the piccolo, two flutes, and the two violin sections playing staccato and spiccato respectively.

The background, sustained harmony of the passage is supplied by oboes, bassoons, Horns III–IV, violas and double basses. The harp adds a bit of color, setting off both the first phrase and its repetition in addition to supporting the final cadence.

The great nineteenth-century orchestrators teach us that if we want to emulate their "big" orchestral sound, whether the dynamic be *forte* or *piano*, it is essential that the doubling be of a mixed color. Further, in order to insure clarity, the rhythms of the elements must be distinct. Finally, varied articulations will help the listener immeasurably to distinguish the different elements in a complex orchestral texture.

Example XV–28. Holst, *The Planets*, "Jupiter," mm. 140–56



Building to the enormous climax at m. 156 in Example XV–28 is accomplished by the combination of three elements. The foreground or main theme is played at first by the four trumpets, then repeated by tenor trombones, tenor and bass tubas, violas, and cellos.

The middleground or subsidiary theme is first sounded by the two tenor trombones, and its repetition by the six horns in unison.

The background or harmony with figuration is scored for the rest of the orchestra. Figuration gives a wonderful buoyancy to this passage. Two piccolos, two flutes, three oboes, three clarinets, plus the two violin sections, are supported by the glockenspiel to provide this sparkle, and during the big tutti (m. 148), two of the trumpets join this melodized harmonic background. The *secco* chords in mm. 140–48 and the heavy bass notes supporting the harmony from mm. 150 to 156 give stability to the rhythm and enhance the flow of the passage. The chord at m. 156 is not only glorious because of the surprising modulation, but also because all motion ceases, and we await with expectation the next event—the brass fanfare.

Example XV–30 from the cello concerto *Schelomo* is similar to the Holst in that it presents two distinct ideas plus a harmonic background, but the two main elements here are much more complex. All the ideas have already been stated separately, so the listener is well aware of them. Again, each has its own distinct shape and rhythmic characteristics. Let us quote the two major elements, and one other that is only touched upon briefly:

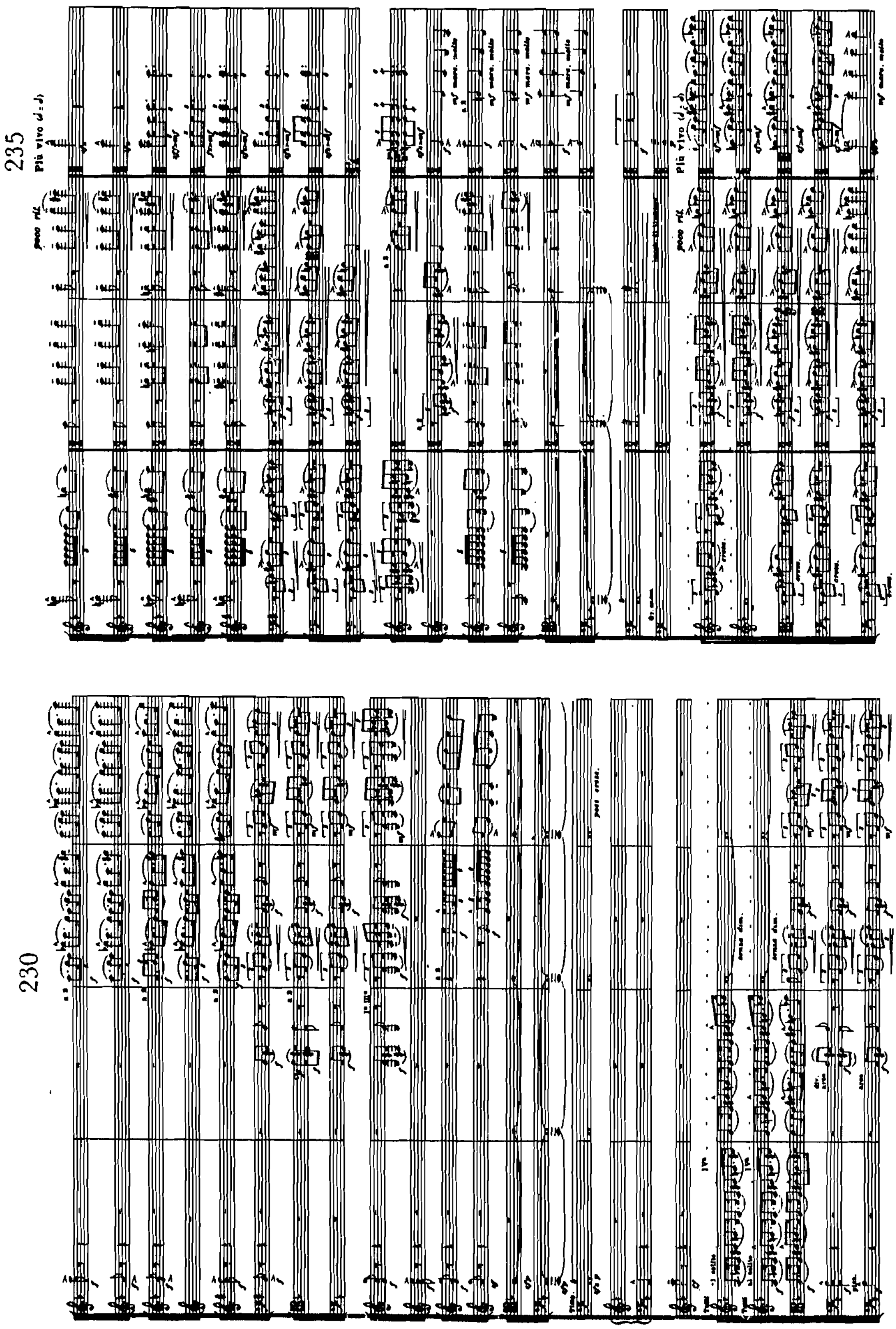
Example XV–29

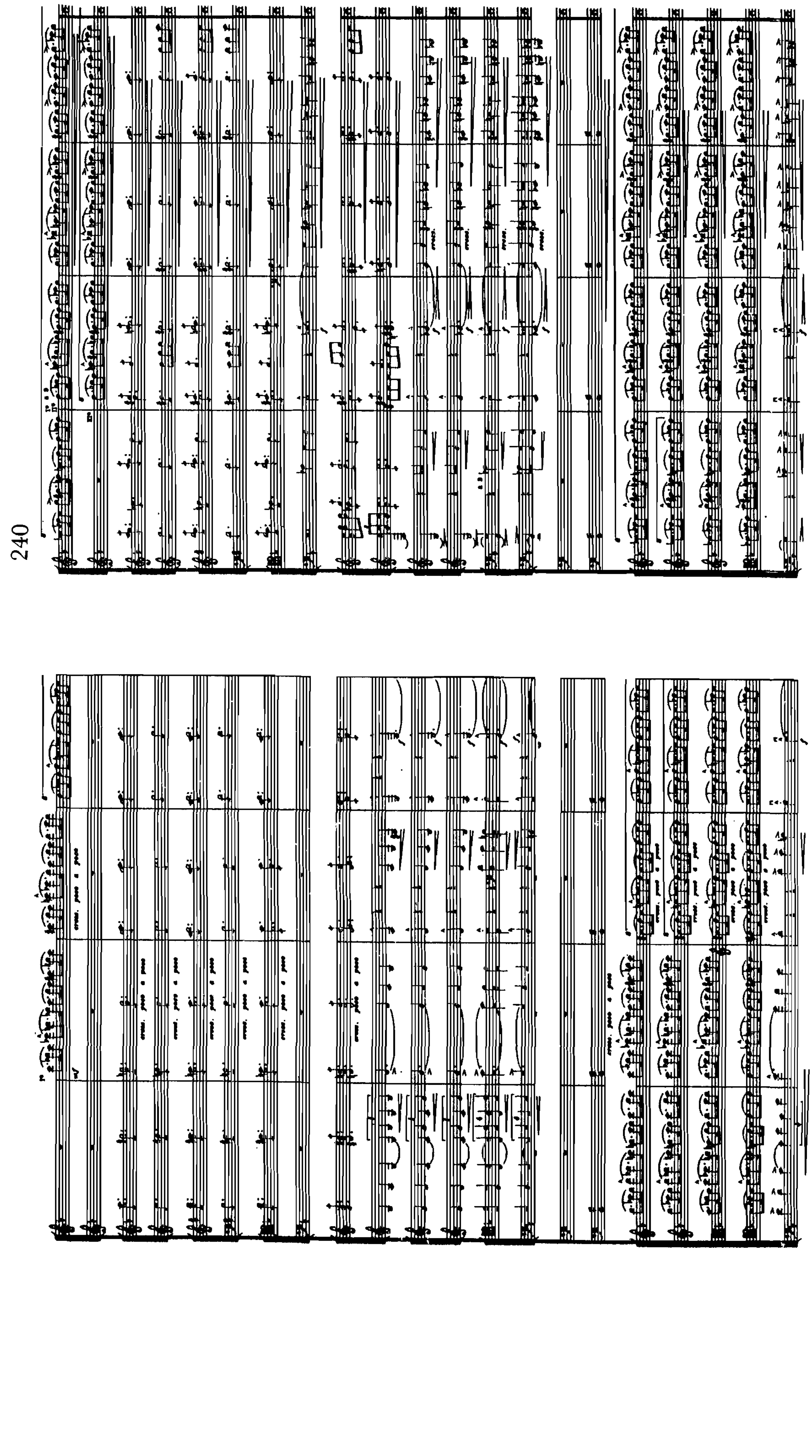


Bloch, like Holst, does not do too much in the way of coloring pitch or passages by combining the different choirs. He is already

*This quote, from the beginning of the concerto, becomes background here and eventually, at [31], the harmonic chords inherit from this figure the straight triplet for their continued articulation.

Example XV–30. Bloch, *Schelomo*, mm. 228–43

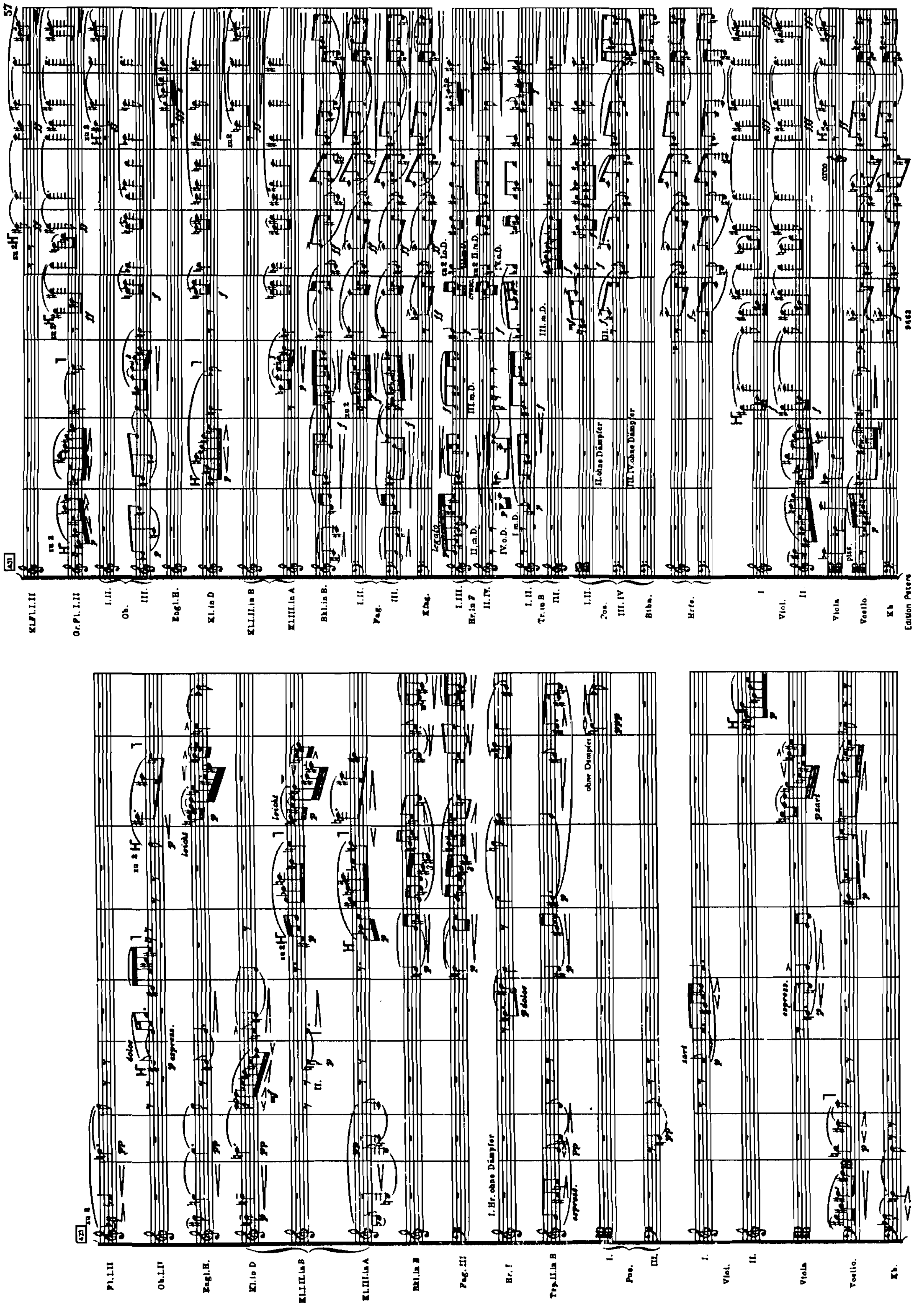


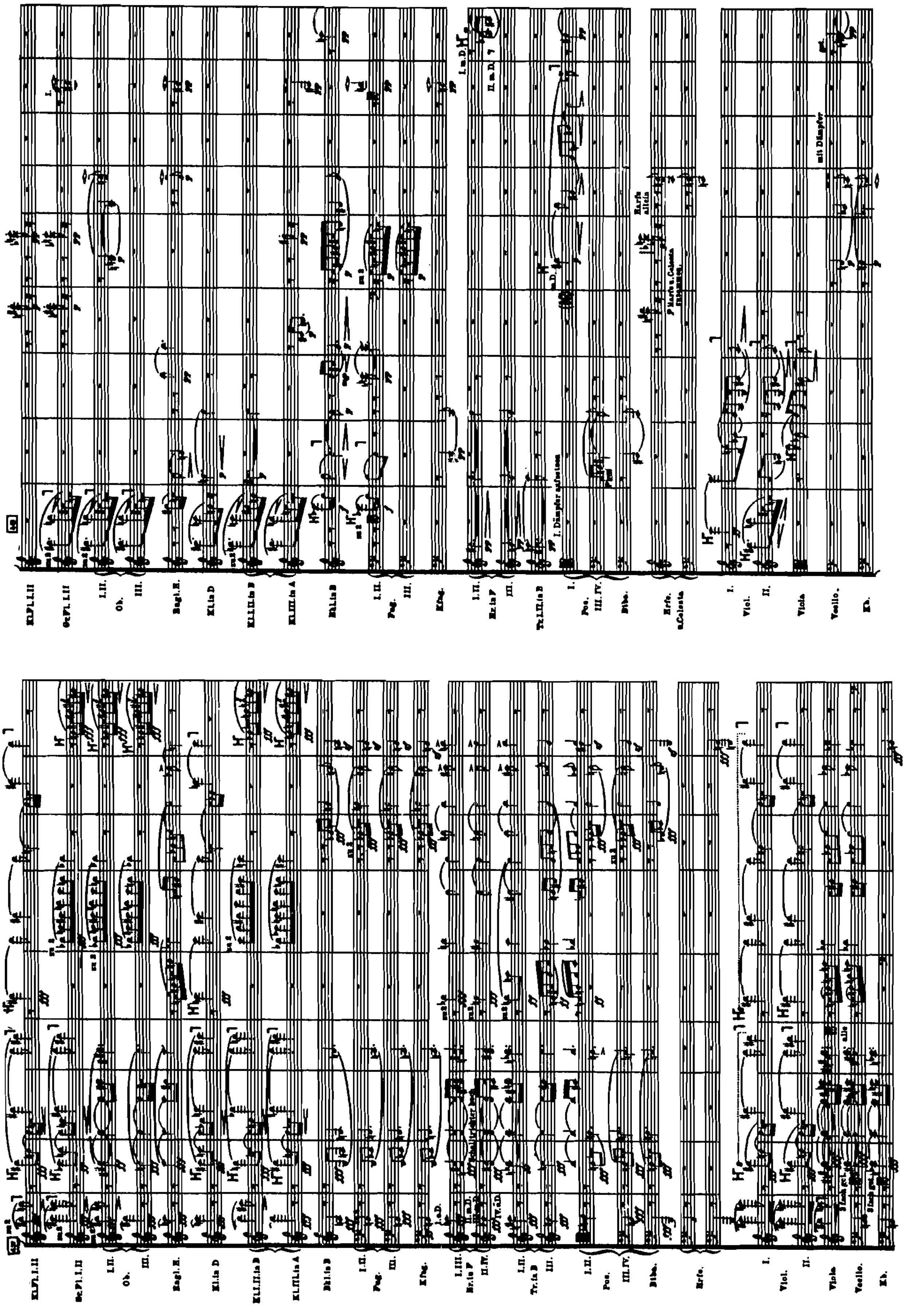

240

much more concerned with choir separations needed to guarantee the clarity of the three distinct elements. This view of orchestration has become increasingly popular during the twentieth century, especially in America. As the climax nears, the composer does add the contrabassoon to the main theme, all the flutes to the middleground, and all the trumpets to the background material. Before this moment (m. 240), he was content to have the double basses alone support the brass main theme, and only the first flute joins the subsidiary tune, while three of the four trumpets strengthened the background harmony. The crescendo to m. 235 as well as the one to m. 243 are greatly aided by a timpani roll and then a bass-drum roll with timpani sticks, which make this latter instrument resemble a more articulate timpani. The composer wisely marks both percussion instruments *piano* and then crescendo, because a *fortissimo* roll would obliterate the rest of the orchestra and completely change the emphasis of this passage, which is meant to develop the themes and combine them for the sake of musical tension, not merely to build a climax.

A most sophisticated and complex contrapuntal excerpt, yet clear and superbly managed in its orchestration will be found in Example XV–31 on pp. 498–99. Schoenberg facilitated the reading of his complex scores by using the following sign to designate the main idea (or ideas) at every moment of the piece: H¬ meaning *Haupstimme* (principal voice) and ¬ when that voice ceases to be the main gesture; in later scores, he used the sign N¬ meaning *Nebenstimme* (subsidiary voice). He also provided dynamics indicating that the principal gestures were to be played louder than the subordinate ones. Notice at mm. 425–32 the gestures marked H¬ are designated *piano*, while the subsidiary ideas, if they lie in any kind of piercing register, are *pianissimo*. Study the doublings very carefully and separate the elements. One will find doublings only at pitch or one octave apart; there are no examples here of wider spacings. Further, this orchestration is much closer to the luscious nineteenth-century sound of the orchestra than to the leaner twentieth-century sound, especially in the full tutti. Naturally, because of the many diverse elements presented simultaneously in mm. 425–38, Schoenberg is careful to assign each fragment to an instrument that will be clearly heard in the complex texture. For instance, the major gesture in the oboe in mm. 425–26 does not need any doubling to speak clearly, while the flutes can stand the help of the clarinets in their lower register in m. 427. In m. 429 the oboes and first clarinet greatly help to delineate the *Haupstimme*, which would otherwise be made subservient to the rather prominent combination of English horn, Clarinet II, and violas

Example XV–31. Schoenberg, *Five Pieces for Orchestra*, Op. 16, No. 5, "Das obligate Rezitativ," mm. 423–56

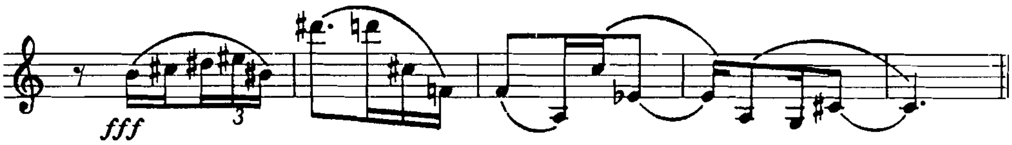




playing a subordinate, but quite active counter gesture. This is not "choir orchestration," but very careful color mixing in order to get the most thrilling kind of effect. The doublings in this excerpt are an extremely subtle effect here, which should be examined carefully so that it may become an integral part of any orchestrator's technique.

Let us look at mm. 447–51. We find the following principal idea:

Example XV–32



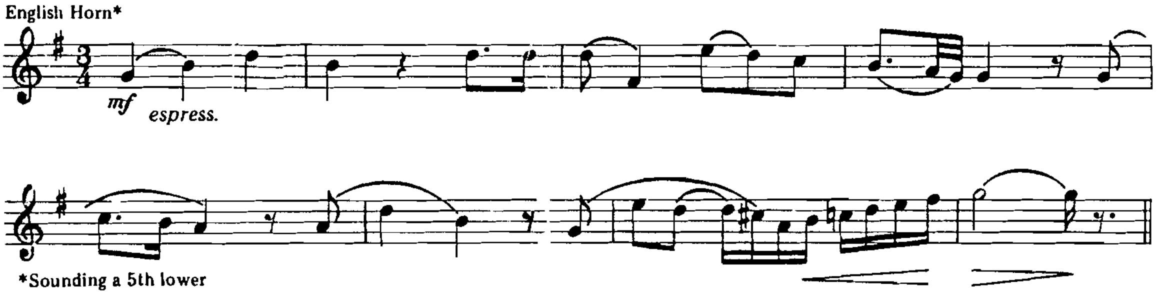
In order to give the impression of a very smooth line, the composer has to "sneak in" instruments that can cover this extremely wide range. He begins with a combination of woodwinds (Flutes I, II, Oboes I, II, Clarinets I, II); in order to highlight the high note reached by a skip of a tenth, he adds the second violins and the piccolo clarinet on that note to offset the rather thin, high oboes. For the final beat of m. 448, he brings in the English horn, bass clarinet, and two bassoons, which are able to extend the ranges of their upper cousins and bridge the register gap. The second violins act as continuity instruments to introduce the violas supported by the first violins, in order to complete the phrase. The entrance of the first violins in m. 448 on a dissonant note adds great tension for a moment, and contributes to the feeling of "resolution" or repose when the C♯ is reached in m. 450. It is important to note, that Schoenberg, as mentioned before in this book, considered all instruments equal and would give a soft, high, lyrical solo to a muted trombone rather than to a cello (mm. 452–56). A soft wind chord such as the one in m. 455, is a sonority that a student should place in his orchestral vocabulary for future use. The extreme ranges add to the tenseness and expansiveness of this effectively orchestrated work.

SOME ADDITIONAL THOUGHTS ON ORCHESTRATION AND SPECIAL DEVICES

Throughout this chapter we have discussed melody, the main voice, or the primary gesture. To recapitulate the thoughts concerning this most important element, we must look at some ways of isolating it from other considerations so that the possibilities of effective scoring for a principal theme are clear in our minds.

Here is the famous English horn solo from the *Roman Carnival Overture* by Hector Berlioz:

Example XV–33. Berlioz, *Roman Carnival Overture*, mm. 21–28



Sounding a fifth lower, it could be played by flute, oboe, clarinet, and even bassoon solo (but that would be a bit high and sound strained). It is certainly playable by all the strings, although it would sound terribly awkward on the double bass. Further, it is playable on the trumpet and horn and even the trombone, although the latter instrument would sound most pinched on the very top notes and not be able to project the quiet elegance that the tune seems to demand. In other words, the registral intensity would completely alter the character of this melody. Besides these instruments, the English horn, alto flute, or soprano, alto, and tenor saxophones could successfully negotiate this line.

Here is where choice and intent become paramount. An orchestrator approves the character of the tune in this particular range compass and then assigns it to a solo instrument befitting the emotional as well as the tonal intent. If this same tune appeared an octave higher, a fifth higher, or two octaves higher, the choice would of necessity be a different one. The same would hold true if it appeared a fifth, an octave, or more below this present register.

The dynamic also has a great deal to do with the choice, for knowing the strengths and weaknesses of every instrument in each register, the orchestrator would certainly have to be influenced by dynamic considerations.

If one wished to strengthen the tune or to give it more power, one could use any of the following measures:

1. Double it at pitch, preferably with instruments that have an affinity for doubling with the assigned instrument:

   English horn doubled by oboe or bassoon or muted trumpet or viola or cello;
   Flute doubled by violin or clarinet (viola and cello when range permits)
   Oboe doubled by English horn or flute or muted trumpet or horn or violin or viola;
   Clarinet doubled by flute or violin or viola or cello or horn (trumpet)

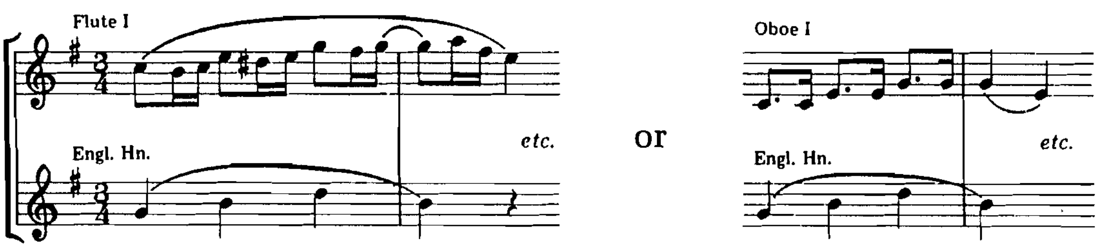
Bassoon doubled by oboe or English horn or all strings or soft trombone or tuba

These are only a few of the most utilized at-pitch doublings. One must realize, however, that at-pitch doublings change the basic tonal quality or characteristic of the resulting sound, and this should be seriously considered before one decides on such a mixture.

2. Another effective way of strengthening a passage is by octave doublings. That means adding octaves above or below by any instrument capable of the range. We may call this "organ" doubling, for it resembles pulling the 4′ or 2′ stops to extend the range one or two octaves upward, or the 16′–32′ stops for similar duty in the opposite direction. We have discussed doubling and tripling instruments at pitch or solo passages to gain power, but this should be reserved for very special effects; however, doubling a tune in a three-octave spread of the two flutes and piccolo, English horn, and two oboes, bass clarinet, B♭ clarinet, and E♭ clarinet, etc., is most desirable.

3. An interesting variation on direct doubling is heterophonic doubling, as we have seen in some of our orchestral examples. In addition to the examples of heterophonic doubling already discussed in this chapter, refer back to the *La Mer* fragment in Chapter 8 (see pp. 247–48), which illustrates this technique so beautifully. Here are two rather obvious examples of how this device might work in the case of the Berlioz tune:

Example XV–34



SOME SPECIAL EFFECTS

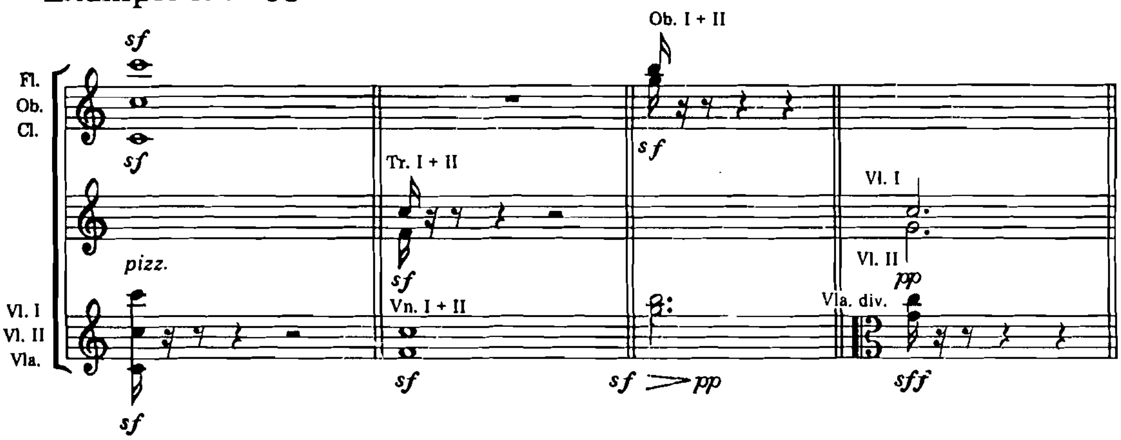
Scoring *sforzandi*

Often an accent is not sufficient to emphasize sforzando, and having an entire orchestra as one's instrument, one does not have to be satisfied with any one method of accomplishing this effect. Here are some suggestions:

1. string pizzicato combined with a longer note in the winds;
2. a short sforzando trumpet note combined with long notes in the strings;

3. a short sforzando note in the oboes combined with long notes in the strings;
4. pizzicato note in the violas with the long notes in the violins.

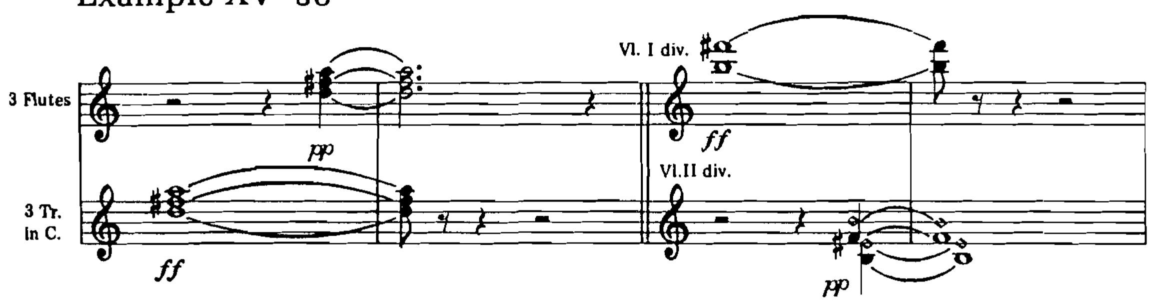
Example XV–35



Some More *forte subito piano* Scorings

This is an effect used often in music today, and the most effective way of scoring it is to have one section play the chord *fortissimo;* then, before that loud sound ends, another choir or combination of instruments enters unperceived at a piano dynamic and simply sustains at that level. When the loud chord cuts off, the *subito* or sudden effect of *piano* will have been accomplished, since the chord is already there at that dynamic. It is essential that the two chords overlap.

Example XV–36

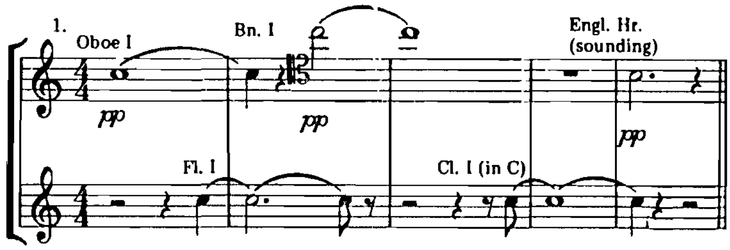


Coloring a Note

This is a similar idea and can be accomplished in a variety of ways. Here are a few:

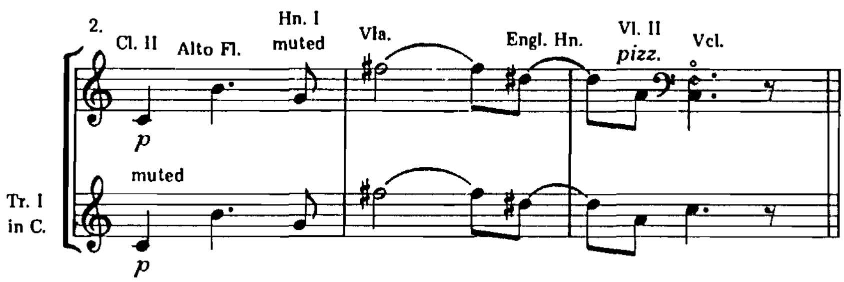
1. Held C colored:

Example XV–37



2. Each note colored by a different instrument:

Example XV–38



3. A rather recent development: the same instrument or like instruments using alternate fingerings to color a pitch:

Example XV–39

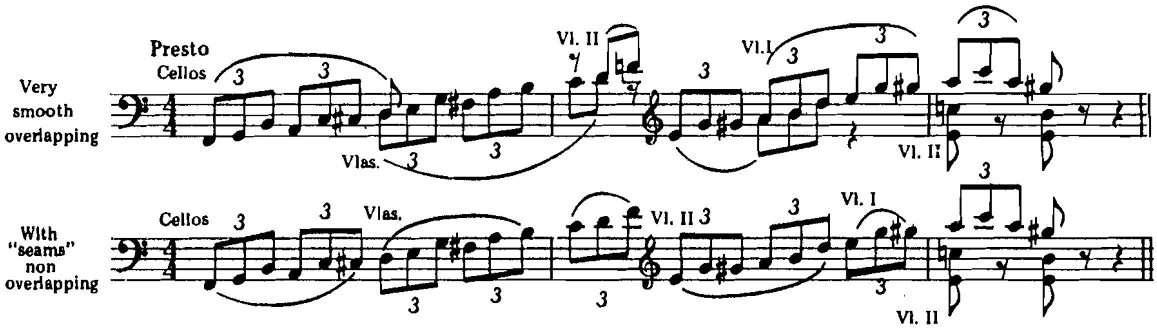


It is relatively easy to color the tone of string instruments by specifying on which string a particular note is to be played. (Review Chapter III for details.) On brass instruments, this can be achieved through alternate fingerings but it is advisable for the orchestrator to consult a seasoned professional in order to determine how best to achieve the desired results. Example XV–39 is a most complex example of this intriguing and effective technique for coloring a pitch.

A Reminder about Dovetailing or Overlapping

In any kind of passage where there is a color change or a swap between similar instruments, make certain that the seams don't show, unless, as in the second example below, one wishes each group of six notes to be accented:

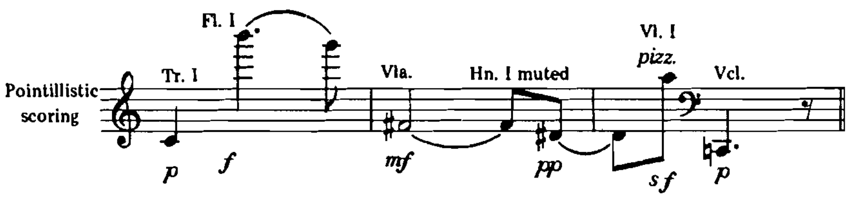
Example XV–40



Pointillistic Scoring

This type of scoring is related a bit to the technique of coloring each note in a melody by using a different instrument, as in Example XV–37. Webern, who is the chief proponent of this kind of scoring, usually does not use one instrument to play a tune but rather assigns each pitch to a different instrument without a "continuity" instrument. Therefore, with some stylistically characteristic octave displacements, our little tune would look (and sound) as follows if it were "pointillistically" scored:

Example XV–41



Notice that each note is assigned a different dynamic, an idiomatic device in this style of composition which adds great interest. The melody is, as a result, quite fragmented, but that is part of the aesthetic that is based on the French school of painting of the same name. Those painters used tiny dots of different unmixed colors to achieve their representational effects. For an authentic page of pointillistic music, study the first movement (mm. 35–39) of the Symphony, Op. 21 by Anton Webern to appreciate the full impact of the technique, which may be used in serial as well as nonserial music.

Klangfarbenmelodie

This German word literally means "tone color melody." Actually, it may refer to a melody, or an entire piece based on one kind of sound. The archetypical *Klangfarbenmelodie* is a continuous phrase with almost every one of its pitches colored by a different instrument. An excellent example is the first movement of Webern's *Symphony* Op. 21, a work based on the following row:



Notice that the second hexachord is the retrograde of the first, beginning a tritone higher. In the work itself this row is permuted in many different ways as noted in the condensed score of the first four-

Example XV–42. Webern, *Symphony* Op. 21, mm. 1–14
a. Condensed score



b. Full score



Webern, *Symphonie*, Op. 21 © Copyright 1929 Universal Edition; Copyright renewed; All Rights Reserved; Used by permission of European American Music Distributors Corporation, sole U.S. and Canadian agent for Universal Edition.

teen measures. For present purposes, our interest in this passage is directed to the result of the *Klangfarben* treatment which colors almost every note with a different instrument or, at mm. 5–7, has the viola playing three successive pitches, two pizzicato and one arco. It is most interesting to note the overall effect of the passage. Because of

the constant variation of colors, the listener gets the feeling of contrapuntal density though the actual texture is very sparse. In this type of music each pitch becomes important for its own sake and lines have to be constructed despite the seeming isolation of each pitch or each gesture. Dynamics, which are so numerous in this score, must be strictly observed to add to the logic of the passage.

Suggested movements or works for further study to clarify the orchestration techniques characteristic of each creative period

Classical Period:
- Beethoven, *Symphony No. 4*, first movement
- Beethoven, *Symphony No. 7*, fourth movement
- Haydn, *Symphony No. 104*, first movement
- Haydn, *Symphonie Concertante in E♭* major, first movement
- Mozart, *Symphony No. 36*, "The Linz," last movement

Early Romantic Period:
- Rossini, Overture to *La Gazza ladra*
- Berlioz, *Roman Carnival Overture*
- Schubert, *Symphony No. 8*, second movement
- Mendlelssohn, Overture to *A Midsummer Night's Dream*
- Bizet, *Symphony No. 1*, first movement
- Schumann, *Symphony No. 4*, last movement

Late Romantic Period:
- Wagner, *Tannhäuser*, Overture and Venusburg music
- Wagner, *Siegfried*, Funeral music
- Lizst, *Les Préludes*
- Brahms, *Variations on a theme by Haydn*
- Bruckner, *Symphony No. 4*, Scherzo
- Bruckner, *Symphony No. 9*, first movement
- Mahler, *Symphony No. 1*, first movement
- Mahler, *Symphony No. 5*, first movement
- Chabrier, *España*
- Rimsky-Korsakov, Suite from *Le Coq d'or*
- Saint-Säens, *Danse macabre*
- Dukas, *Le Sorcier apprenti*
- Strauss, *Don Juan*
- Strauss, *Tod und Verklärung*
- Tchaikovsky, *Symphony No. 4*, finale
- Tchaikovsky, *Romeo and Juliet* Overture

Impressionism:
- Debussy, *La Mer*, last movement
- Debussy, *Jeux*

- Debussy, *Nocturnes, Nuages and Fêtes*
- Ravel, *Rapsodie espagnole*
- Ravel, *Piano Concerto*
- De Falla, Suite from *The Three-Cornered Hat*

Early Twentieth Century:

- Schoenberg, *Five Pieces for Orchestra*, Op. 16
- Schoenberg, *Gurre-Lieder*
- Stravinsky, *Petrushka*
- Stravinsky, *Feu d'artifice*
- Stravinsky, *Concerto for Piano and Winds*
- Berg, *Three Pieces for Orchestra*
- Berg, *Lulu Suite*
- Webern, *Six Pieces for Orchestra*, Op. 6
- Varèse, *Amériques*
- Hindemith, *Sinfonia serena*
- Hindemith, *Die Harmonie der Welt*
- Bartók, *Piano Concerto No. 2*, last movement
- Bartók, *Dance suite*
- Copland, *Music for the Theater*
- Copland, *Symphony No. 3*
- Harris, *Symphony No. 3*
- Shostakovich, *Symphony No. 1*, first movement
- Shostakovich, *Symphony No. 15*, first movement
- Prokofiev, *Symphony No. 5*, first movement
- Prokofiev, *Piano Concerto No. 3*, first movement
- Piston, *Symphony No. 4*, second movement
- Sessions, *Symphony No. 2*, first movement
- Barber, Overture to the *School for Scandal*
- Vaughan Williams, *Symphony No. 4*

Late Twentieth Century:

- Schuller, *Seven Studies on Themes of Paul Klee*
- Schuman, *Symphony No. 3*, first movement
- Schuman, *Credendum*
- Carter, *Double Concerto* (piano and harpsichord)
- Britten, *Four Sea Interludes* from *Peter Grimes*
- Druckman, *Prisms*
- Schwantner, *Sudden Rainbow*
- Rouse, *The Infernal Machine*
- Colgrass, *As Quiet As*
- Fine, *Symphony No. 1*
- Messiaen, *Turangalîla*
- Messiaen, *Réveil des Oiseaux*
- Stockhausen, *Hymnen*
- Adams, *Harmonielehre*

16

The Orchestral Transcription

The transcription of a piece of music from one medium to another is very much like the translation of a poem from one language to another. While all those who speak the original language will invariably claim that a poem can never be successfully translated and loses its essence in the process, the people who do not understand the original tongue will benefit by being able to fathom something that was beyond their grasp before the transformation was accomplished. There are instances where great poets of one language undertake to translate poems from another, and create magnificent masterpieces. The arguments pro and con have been with us for many years in poetry as well as in music. In our own time, when "purists" maintain that no one should tamper with the music of the past, history answers with very strong reminders that transcription is perhaps as old as composed music itself.

Let us go back only as far as the Baroque period, and we see overwhelming evidence that even the greatest composers of that time transcribed their own pieces several times over in their lifetimes, besides adapting the works of their contemporaries and predecessors. Some composers of this period wrote works in which they did not even specify the exact instrument that would perform a given line, but simply said, "any C instrument, etc." To cite only a few examples: Bach's version of the violin concertos of Vivaldi; his own adaptations of movements from his instrumental music as sinfonias (for orchestra) for some of the cantatas; or his transcription of his violin concertos to keyboard concertos (the E-major violin concerto became the D-major keyboard concerto); Handel's transcription of the second movement of the D-major violin sonata as a chorus and

orchestra piece in his oratorio *Solomon*. These examples don't even begin to describe the frequency of transcription during the Baroque period. The practice grew with each successive decade (Beethoven even made a transcription of his violin concerto for piano and orchestra), until it reached almost epidemic proportions in the nineteenth century, when every great work was transcribed either for piano two hands, piano four hands, two pianos, or violin and piano, etc. It was considered a wonderful way for amateur musicians to become familiar with the masterworks in the privacy of their own homes. Liszt transcribed all the symphonies of Beethoven for piano; on the other hand, Brahms, Dvořák, and Grieg transcribed their "ethnic" dances (Hungarian, Slovakian, Norwegian) from piano four hands to orchestra. It is hardly necessary to justify the art of transcription today, since a great many works in our standard orchestral repertoire are transcriptions of original piano works. Besides the above-named dances, Liszt's *Hungarian Rhapsodies*, Bizet's *Jeux d'Enfants* (Children's Games), and almost all the works of Ravel bear witness to this statement. There can be justifiable claims that a work like Mussorgsky's great *Pictures at an Exhibition* is more effective in Ravel's orchestral transcription than in the original piano version, or that Husa's *Music for Prague* sounds better for orchestra than in the band version; conversely, Schoenberg's *Variations* Op. 43 sound better for band than for orchestra. We certainly do not wish to get embroiled in any of these controversies, save to say that the art of transcription is a most valid one and should be carefully mastered. Most important for the mastery of this skill are the following considerations:

1. a thorough and complete knowledge of all the instruments, their capabilities and range characteristics;
2. an intimate knowledge of the form and details, as well as a love for the work to be transcribed;
3. an insight into the orchestral style of the composer whose work is to be transcribed, or if that composer has not written for orchestra, a thorough familiarity with the orchestral practices of the era in which the composer lived;
4. a purpose for wishing to transcribe a particular work:
   a. the best reason being that the work "cries out" for an orchestration;
   b. the original composer wished to orchestrate the work but for some reason was never able to accomplish this;
   c. the all-important pragmatic reason: a conductor asks a composer to orchestrate a work because he wishes to perform it;
   d. certain instruments for which the work was originally scored are not available.

For our immediate purposes, it will be necessary to transcribe the pieces in our workbook for a less glamorous but nonetheless most important reason, and that is to learn the art of transcription.

Besides the conditions listed above, one overriding consideration must guide us, and that is taste. We must respect the work, the composer, and the period in which the piece was conceived, and use our best judgment in every decision we reach about the particular music: the size and composition of the orchestra; the suitability of an instrument to present a certain phrase; and the conviction that our orchestration will clarify the form of the entire composition.

Before we examine the practical aspects of this skill, we should clarify the distinct difference between transcription and arrangement.

Transcription is a transferance of a previously composed work from one musical medium to another.

Arranging involves more of the compositional process, for the previously existing material may be as little as a melody or even a partial melody for which the arranger must supply a harmony, counterpoint, and sometimes even rhythm before thinking about the orchestration.

In this chapter we shall address ourselves primarily to the problem of transcriptions for orchestra from another medium. If an arrangement is called for, the same procedures for orchestration that apply to transcription should then be adopted once the tune has been harmonized and arranged fully in a piano or short score.

Three main areas will be studied: transcribing from

1. keyboard or small chamber combinations to orchestra;
2. band or wind ensemble to orchestra;
3. orchestra to smaller combinations of instruments.

TRANSCRIPTIONS OF MUSIC FOR KEYBOARD OR SMALL CHAMBER COMBINATIONS TO ORCHESTRA

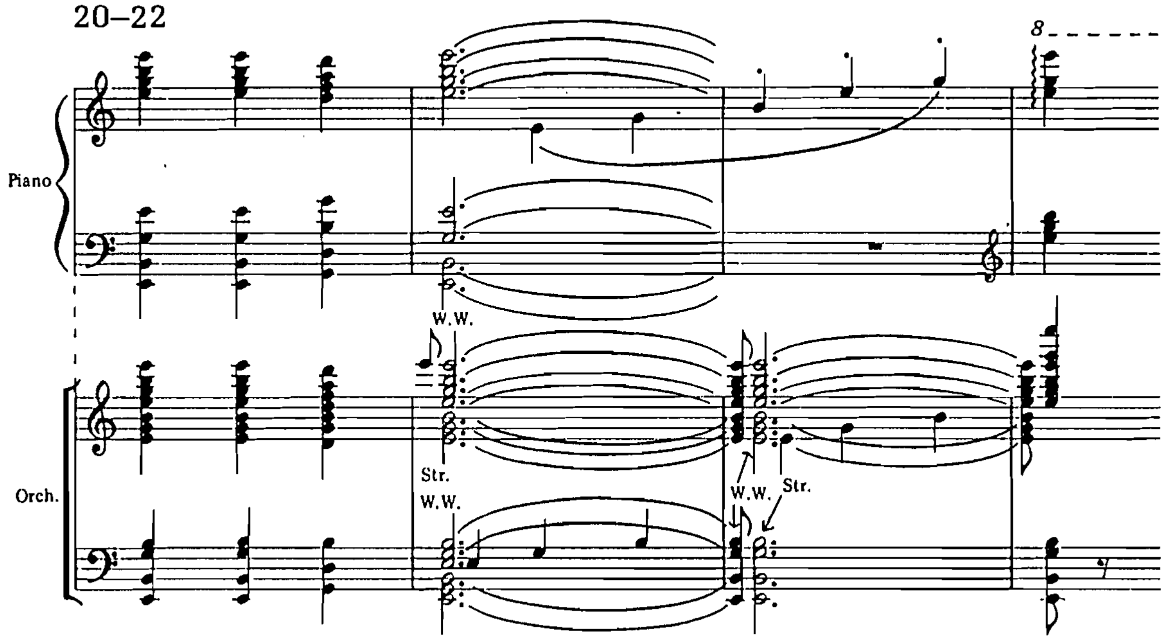
Transcription from keyboard to orchestra is the most common type of medium change, and seems to work well. We have already mentioned the dances of Brahms and Dvořák, but the most amazing transcriptions are those from keyboard to orchestra made in our own century. Ravel wrote all but three of his brilliant orchestral works for

first, and what is most surprising, Stravinsky wrote his early ballets initially for piano. This may have been for the purely practical reason that a rehearsal version was essential; nevertheless, it tells us that transcriptions from piano to orchestra can produce idiomatic orchestral music if judiciously executed.

Here are some fundamental considerations:

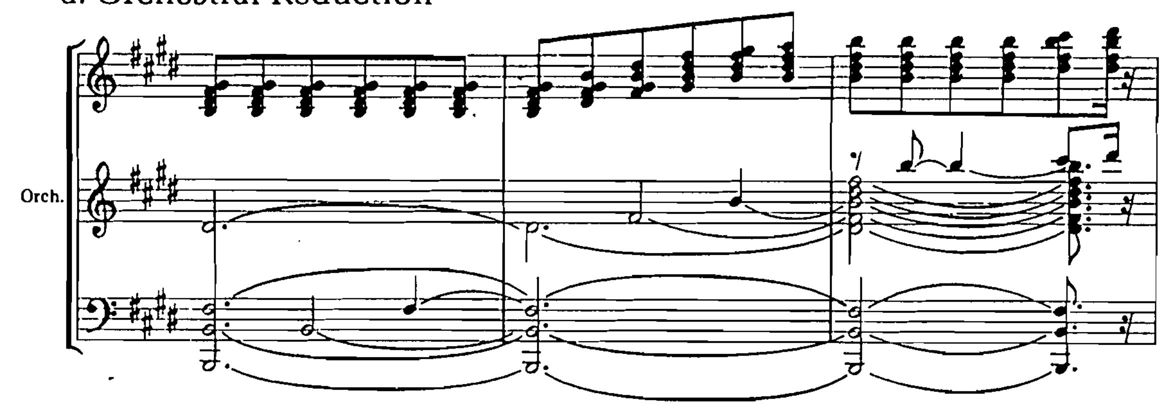
1. Do not try to simulate the piano, but rather change piano idioms to orchestral ones, retaining the spirit of the music.

Example XVI–1. Ravel, *Ma Mère L'Oye,* "Le Jardin féerique," mm. 20–22

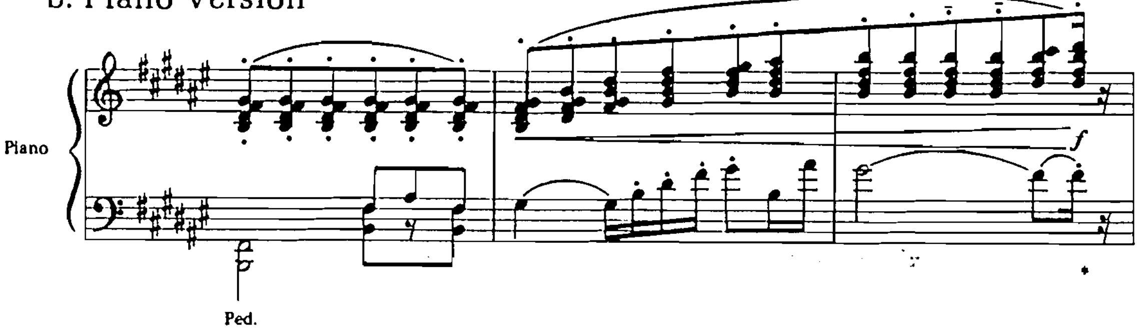


Example XVI–2. Ravel, *Menuet antique,* mm. 64–66

a. Orchestral Reduction



b. Piano Version



2. Remember that the piano is played by one person, while the orchestra is an aggregate of many; therefore, everything must be judged in that light. There are times when a rhythmic simplification, an alteration in notation, or a metric change is necessary for clarity in the orchestra. These may be problems that never interfere with the performance of the pianist.

Example XVI–3. Bartók, *Mikrokosmos*, No. 5; "Syncopation," mm. 1–3

a. Original notation



b. Easier for orchestra in this rhythmically notated version



3. A crescendo, diminuendo, rubato, or even a fermata is made clearer when actually written out in an orchestral score. Ravel, the master of the transcription, does this frequently. Here are some examples by other composers:

Example XVI–4. Mahler, *Lieder eines fahrenden Gesellen*, No. 1, "Wenn mein Schatz," mm. 89–96



Example XVI–5. Beethoven, *Symphony No. 6*, first movement, mm. 304–12



Example XVI–6. Bizet, *Jeux d'enfants*, "La Toupie," mm. 1–5



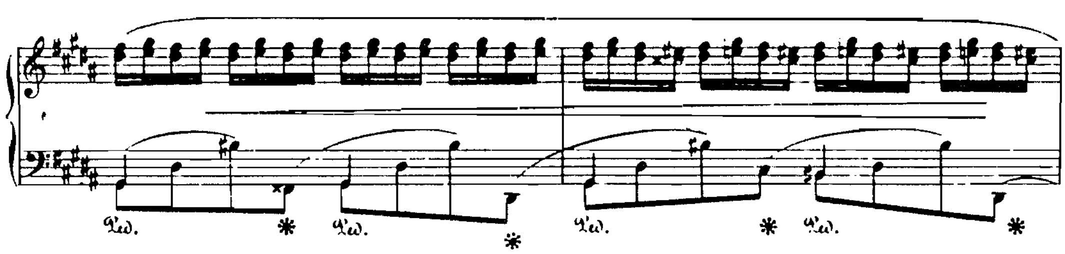
4. Although it is admittedly impossible to simulate the piano sound, we must interpret important piano notations that can help us render the transcription faithful to the composer's intentions. A prime area of consideration will be the sustaining and *una corda* pedalings in the piano score. *Una corda* literally means "one string" and signifies the use of the soft pedal, which shifts the inside action of the piano so the hammers strike only one or two of the three strings. This effect may be realized for orchestra by muting the instruments in such a passage.

Idiomatic piano writing must acknowledge the physical limitations of the pianist. Chords that can easily be performed by an orchestra need to be arpeggiated for piano because of the limited stretch of the human hand. Layers of linear activity in the music must be studied carefully, because some inner or even outer thematic material may be only outlined in the piano, while in the orchestra these multiple lines can be made to sound and sustain simultaneously without any difficulty. This is also true of implied harmony. The transcriber should be thoroughly familiar with the music, so that all the harmonic and melodic "hints" can be used to enrich the transcription.

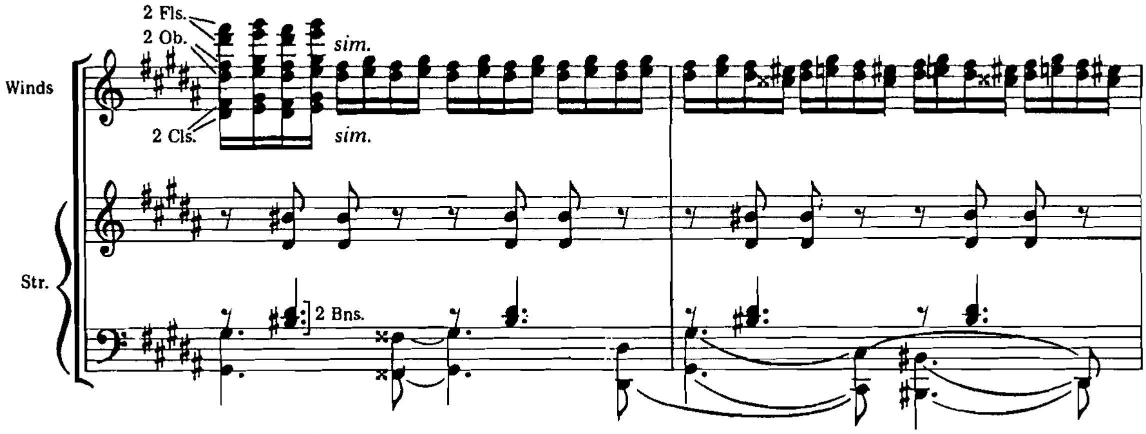
When a contrapuntal work is to be orchestrated, the limitless possibilities of an orchestra are even more tantalizing. A pianist, however gifted, is able to apply a very limited coloration to the individual lines of a contrapuntal work, no matter how clever and varied his articulations. The orchestrator has a variety of colors to work with and can easily feature the various lines. When we studied the use of the orchestra in the previous chapter, we cautioned the novice not to become too colorful, lest he confuse the form and upset the musical scheme. This caution must be reiterated even more strongly in regard to transcribing another composer's work. Studying the layers of the music and determining their order of importance is paramount to a successful transcription, whether the piece is homophonic or polyphonic.

Here are some examples that deal orchestrally with the pianistic phenomena mentioned above:

Example XVI–7. Chopin, *Etude*, Op. 25, No. 6, mm. 39–40
a. Original Version

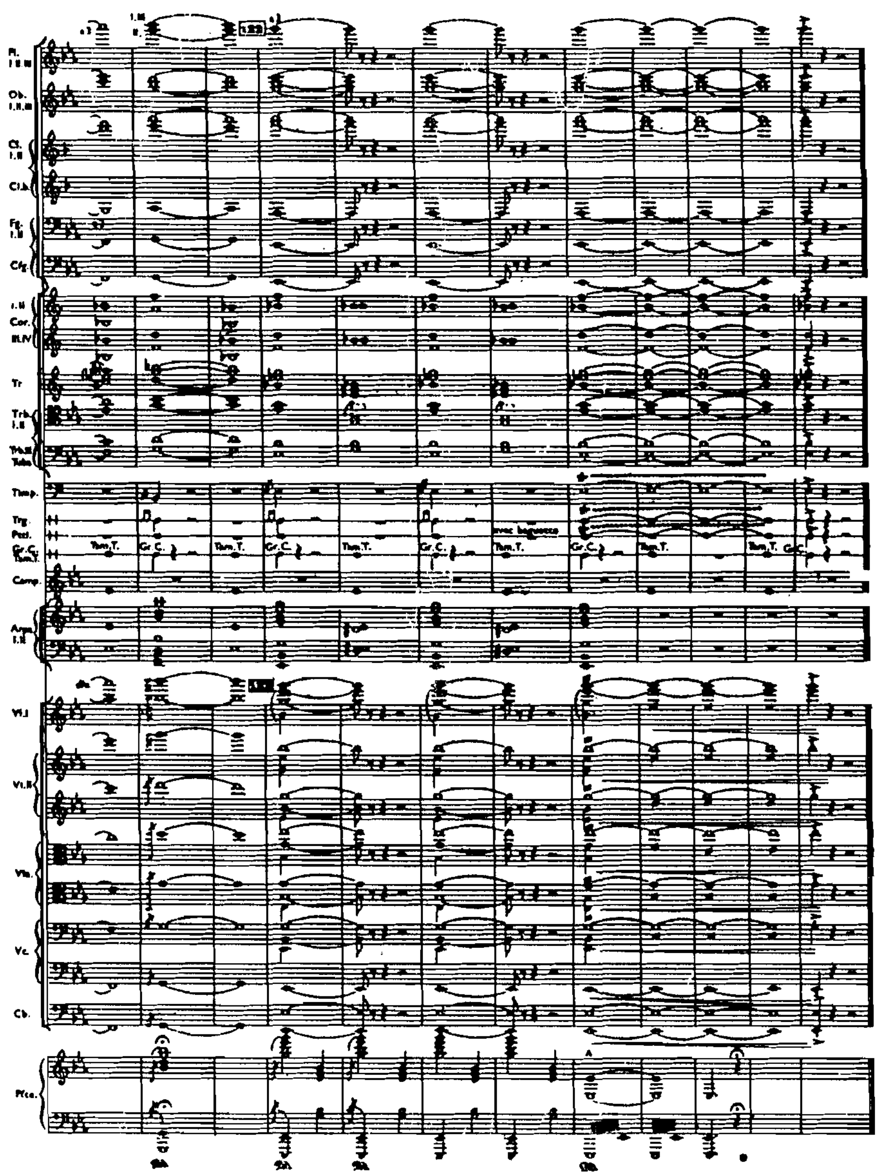


b. Orchestral Version



Example XVI–8. Mussorgsky-Ravel, *Pictures at an Exhibition*, "The Great Gate of Kiev," final 22 measures





Once again, the very best way of learning how to do these transcriptions in the most professional manner is to study some successful models from the great piano-orchestra transcription literature. Most of these examples are simple and straightforward, but those are attributes toward which we should strive, especially in the beginning.

Brahms has created a most interesting and effective transposition of the original piano four-hand version of the *Hungarian Dance No. 1*. He heightens the dynamics of the orchestra from *mezzo-forte* to *forte* in the opening string passage, and in m. 5, which is soft in the piano, the winds are marked *forte*. This change adds zest to the orchestral version. Notice the beautiful scoring of the strings with the steady pizzicato bass and the independent cello part giving the "Hungarian" rhythm, while the violins, with first bassoon doubling the violas, play the tune. Also note that the entire harmony is not sounded until the first offbeat in m. 3, so as not to thicken the downbeat suddenly. The woodwind arpeggio is most imaginatively scored:

Example XVI–9. Brahms, *Hungarian Dance No. 1*, mm. 1–48

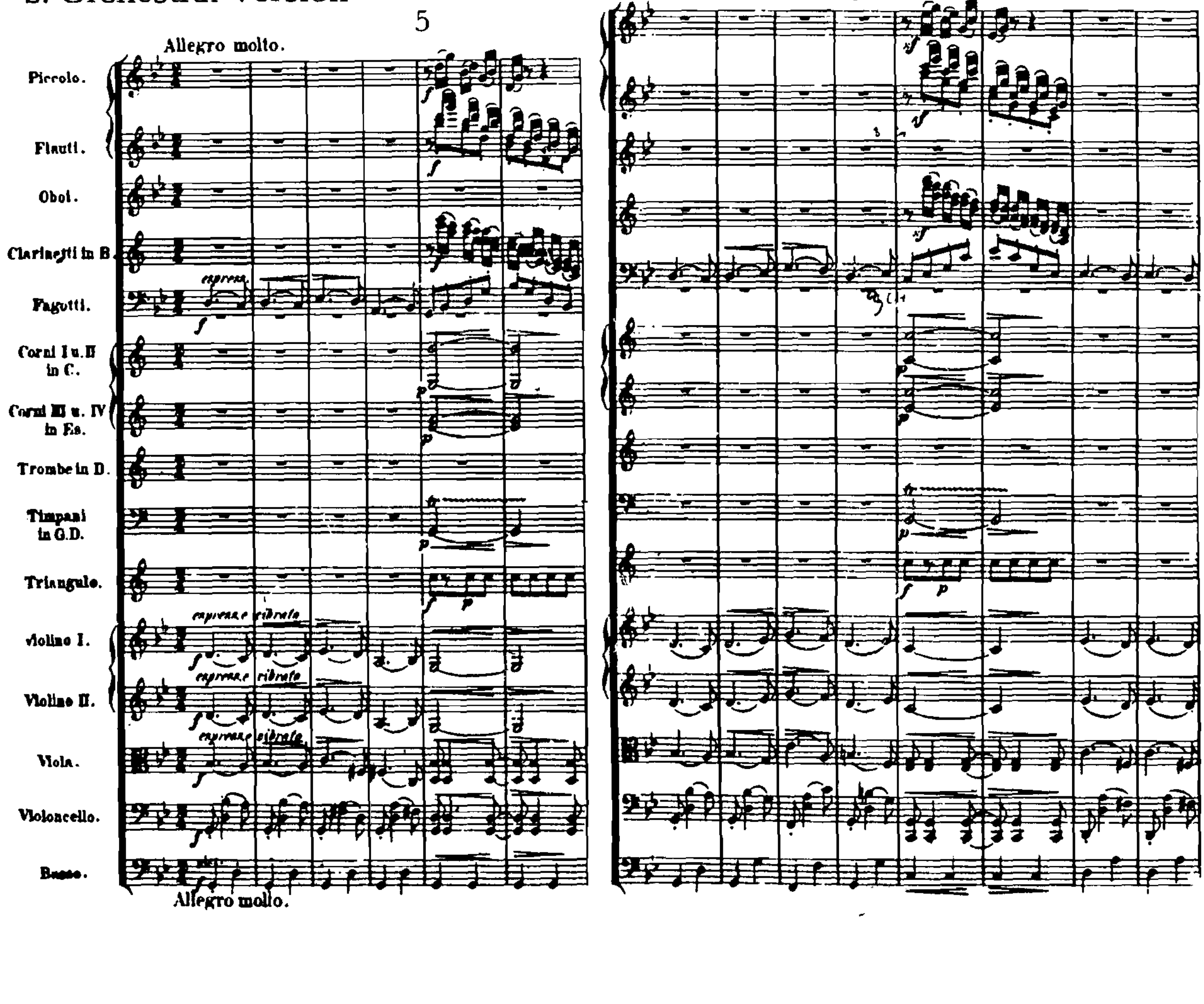
a. Piano 4-Hand Version





b. Orchestral Version

10




15
20
25
30
35
espress.
pizz.
arco
cresc.



while the piccolo and first flute are playing it, the two clarinets "flutter" in the opposite direction with the implied harmony notes. At first, the composer entrusts the staccato pitches only to the second flutes, but the first bassoon then doubles them in the second measure (m. 6). Meanwhile, a bit of color is added to the sustained note of the violins, by the horns supplying the harmony, and by the addition of the timpani and triangle. In mm. 5–6, the violas join the cellos to articulate the offbeat rhythm. We have quoted this piece at length to show how long Brahms retained the same color combination before changing it. When he finally does, at m. 25, notice how the triplets of the *secondo* part are realized in the violas, and how curious it is that the dynamics are not the same as in the piano version. (For example, the piano version begins *mezzo-forte*, the orchestra *forte*; in m. 6, primo piano plays *piano*, while woodwinds play the same passage *forte*, etc.). Here the change is more obvious, for Brahms orchestrates the *mezzo-forte* by doubling the violins with horns and oboes.

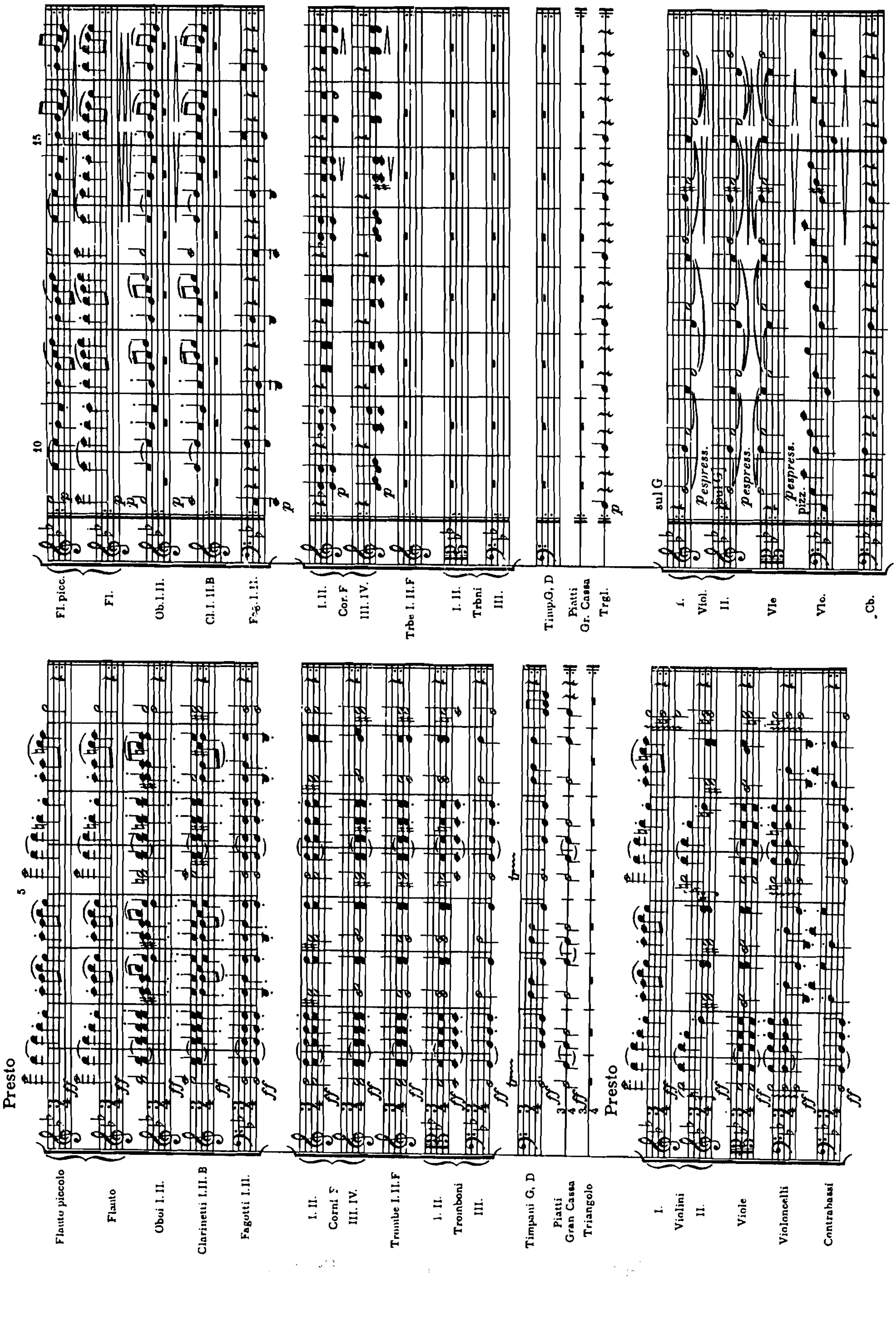
We offer a bit of Dvořák's exciting transcription of his *Slavonic Dance No. 8* for its thrilling tutti opening and the immediate contrast when the tune is played softly. In the first few measures, compare the second violin and oboe parts for the interchange of doublings; notice too the emphasis on the melodic figure, which the composer achieves by the largest amount of doubling (piccolo, flute, first oboe, second clarinet, and first violin). The trace notes of the second violin and the chord of the cello, both of which include open strings, give a special ring to the opening chord. Otherwise, it is a traditionally well-orchestrated tutti with a bit of "dance color" supplied by the cymbal and bass drum. Beginning at m. 9, the orchestration is quite different, with a strong, but soft color for the melody, a light accompaniment, and sustained "harmonic counterpoint" in the strings. Although there is no indication of this "harmonic counterpoint" in the piano part, the pianist would use a slight amount of sostenuto pedal here to reinforce the harmonic notes, which are important enough to be emphasized and sustained in order to complete the harmony without making it heavy.

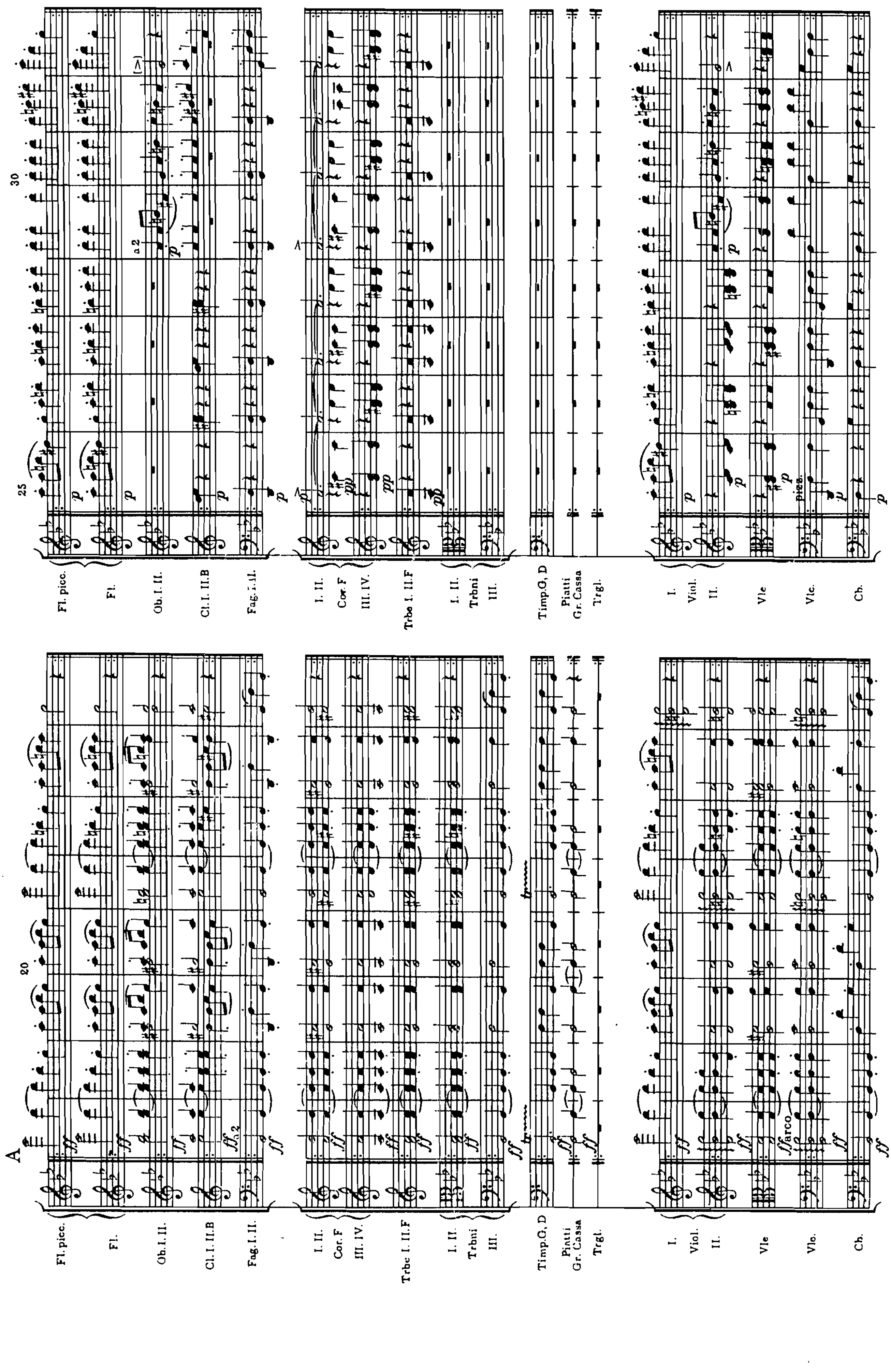
The repetition of the first strain at m. 17 is a bit more open in the distribution of the chords, particularly in the horns and middle string parts. Without changing the basic color, Dvořák reworked the

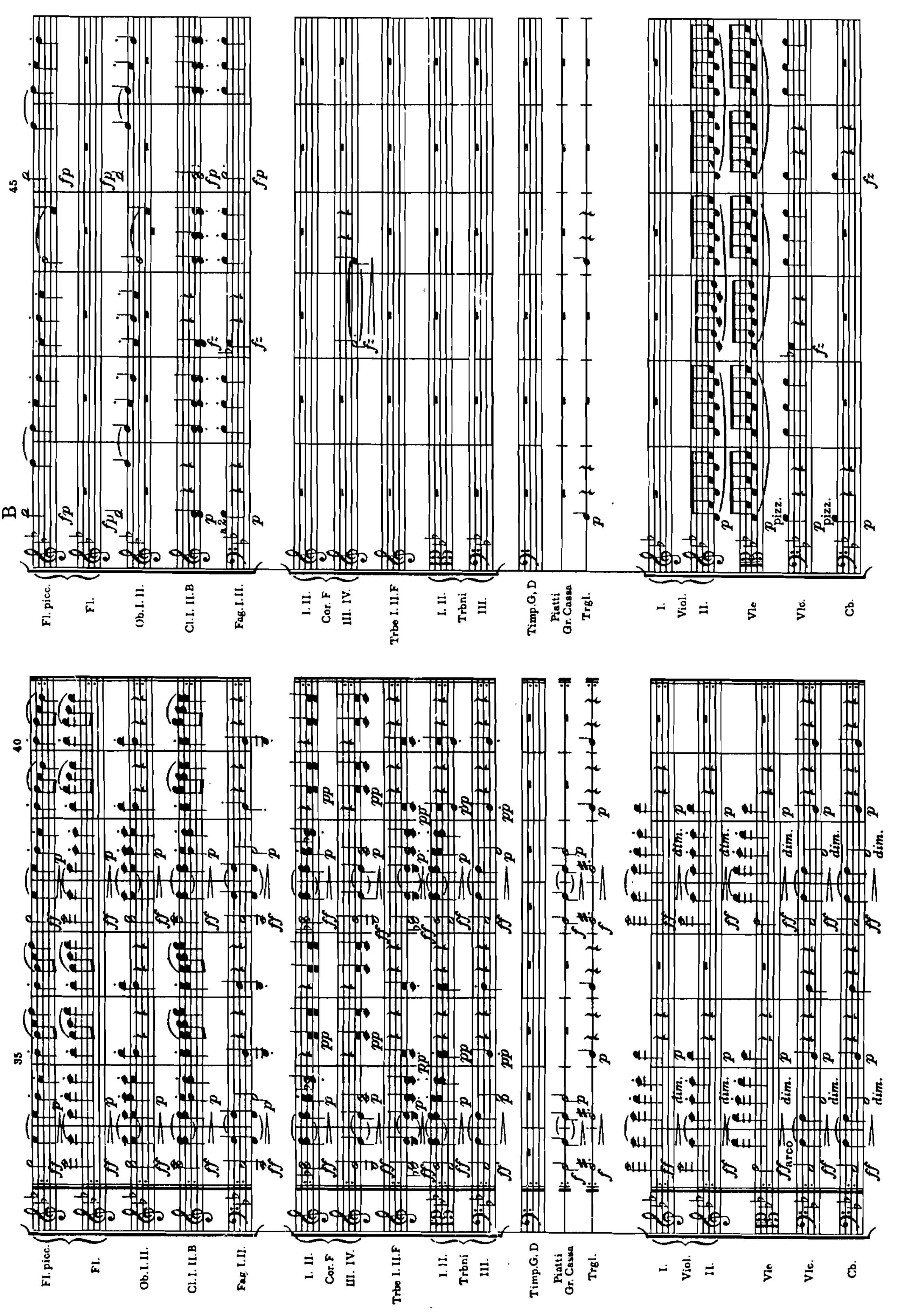
Example XVI–10. Dvořák, *Slavonic Dance No. 8*, mm. 1–48
a. Piano 4-Hand Version



b. Orchestral Version, mm. 1–46



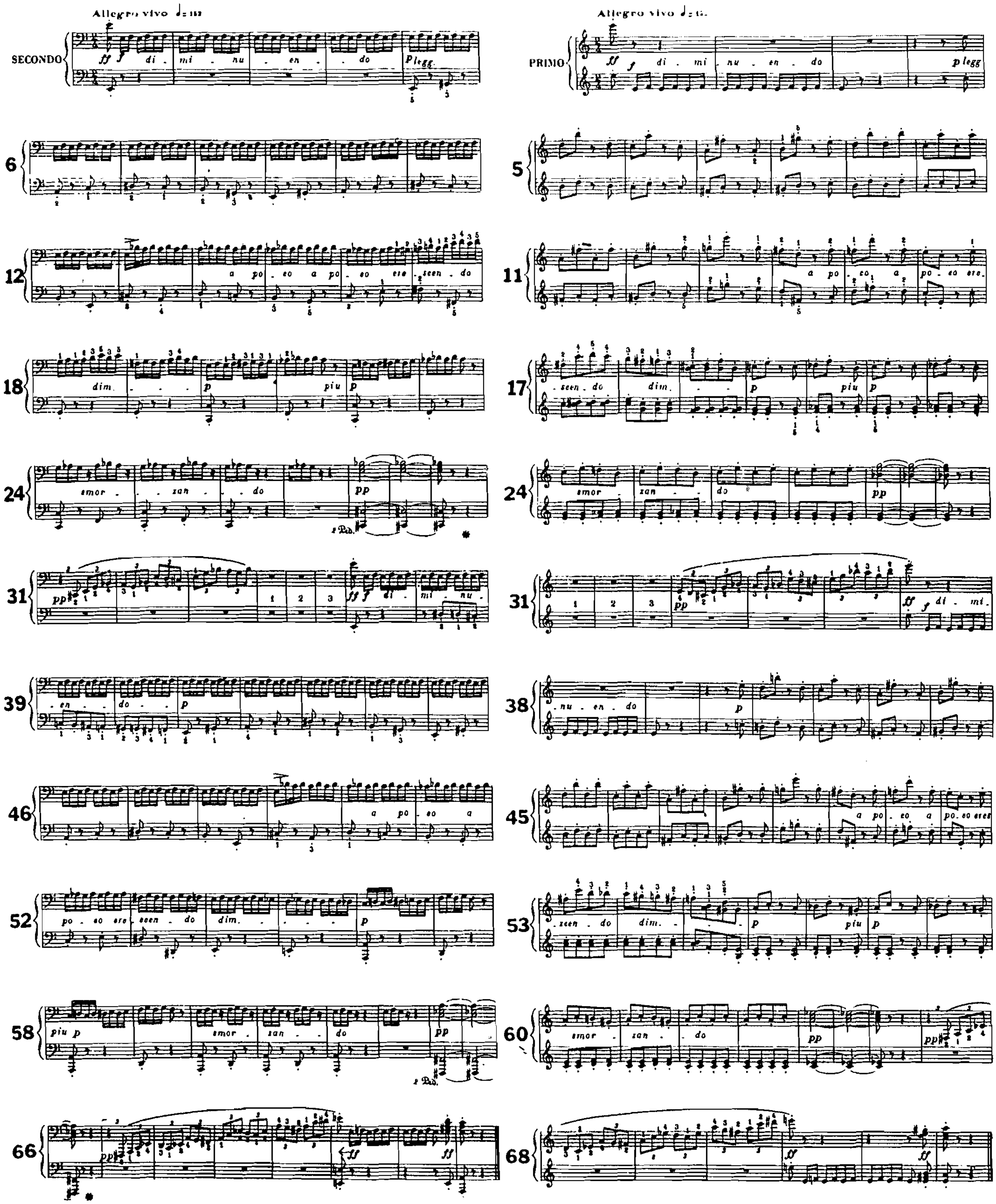

A
Fl. picc.
Fl.
Ob. I. II.
Cl. I. II. B
Fag. I. II.
Cor. F
Trbe I. II. F
Trbni
Timp. G, D
Piatti
Gr. Cassa
Trgl.
Viol.
Vle
Vlc.
Cb.


Fl. picc.
Fl.
Ob. I. II.
Cl. I. II. B
Fag. I. II.
I. II. Cor. F III. IV.
Trbe I. II. F
I. II. Trbni III.
Timp. G, D
Piatti Gr. Cassa
Trgl.
I. Viol. II.
Vle
Vlc.
Cb.
35
40
B
45

tutti admirably, to give it a slightly different hue. The new answer to this strain (m. 25) is most expertly worked out and should be closely compared to the piano version. The delay of the oboe entrance clarifies the tune much better, and makes the last four measures sound truly polyphonic. At m. 33, we have a model of exactly how one accomplishes a diminuendo from *fortissimo* to *piano*. First examinine the piccolo part, which has been written an octave lower than before to enable the player to accomplish the diminuendo to *piano;* all other instruments are also in controllable ranges. The dropout of the strings, which have been playing continuously since the beginning of the piece, is a great relief here and also serves as a bridge color to the next section, in which the strings only perform a supporting role.

The *Jeux d'enfants* of Bizet is another work originally written for piano four hands. It is a very simple but most sensitive transcription for orchestra with many valuable devices for us to master. The opening octaves are excellently distributed and the diminuendo clearly orchestrated, instead of being left to the players or conductor. A playful kind of orchestration is used to strengthen the E pedal by "rhythmatizing" it in the third horn. This gives stability to those measures where the flutes do not play on the second beat, and provides a light offbeat accent to the others. Notice that Bizet spells the D♯ in m. 7 enharmonically in the orchestral version, perhaps to clarify the diminished-seventh-chord effect. Just as he orchestrated a diminuendo in the beginning, he did the same for the crescendo, mm. 13–18. A most fascinating addition in the orchestral version may be found at m. 28, with the "whispering" tritone in the cellos and the roll in the timpani. The dynamic of the chord was changed from *pp* to *ppp*, but motion was added to enliven the sustained chord. The triplet run which follows is an excellent example of dovetailing for absolute smoothness from the bottom to the top. The repetition of the little piece should be carefully studied for the slight, but significant changes Bizet makes in the orchestration to give the repeat a different flavor. It is a fuller version with the sixteenth notes and the melody doubled at pitch. All this was preceded by a chromatic scale in the clarinets and bassoons, which possibly anticipates the new scoring. The fourth horn sustains the pedal, while the trumpets maintain the rhythm previously provided by the third horn, and the pizzicato doubling of the flutes lends great charm. Ten measures before the end, the "whispering" tritone is repeated, but the triplet run this time dovetails through the woodwinds for a real color change. The ending is scored quite traditionally, but the spacing and octave doublings of the final chords should be studied because they are exemplary.

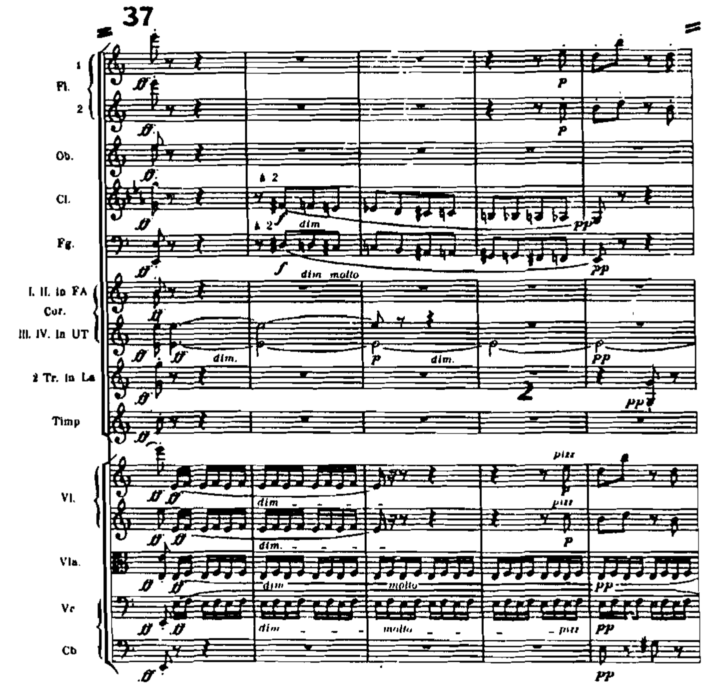
Example XVI–11. Bizet, *Jeux d'enfants*, "La Toupie" (entire piece)
a. Piano 4-Hand Version



b. Orchestral Version




31
Vl.
Vla.
Vc.
Cb.
pp


37
Fl.
Ob.
Cl.
Fg.
I. II. in FA
Cor.
III. IV. in UT
2 Tr. in La
Timp
Vl.
Vla.
Vc
Cb
ff
dim.
dim molto
pizz
pp


42
Fl.
Ob.
Cl.
Fg.
I. II. in FA
Cor.
III. IV. in UT
2 Tr. in La
Vl.
Vla
Vc
Cb


48
Fl.
Ob
Cl.
Fg
I. II. in FA
Cor.
III. IV. in UT
2 Tr. in La
Vl
Vla.
Vc
Cb
pp
p
div


54
Fl.
Ob.
Cl
Fg.
I. II. in FA
Cor.
III. IV. in UT
Vl.
Vla.
Vc
Cb
p
ppp
più p
pp
div

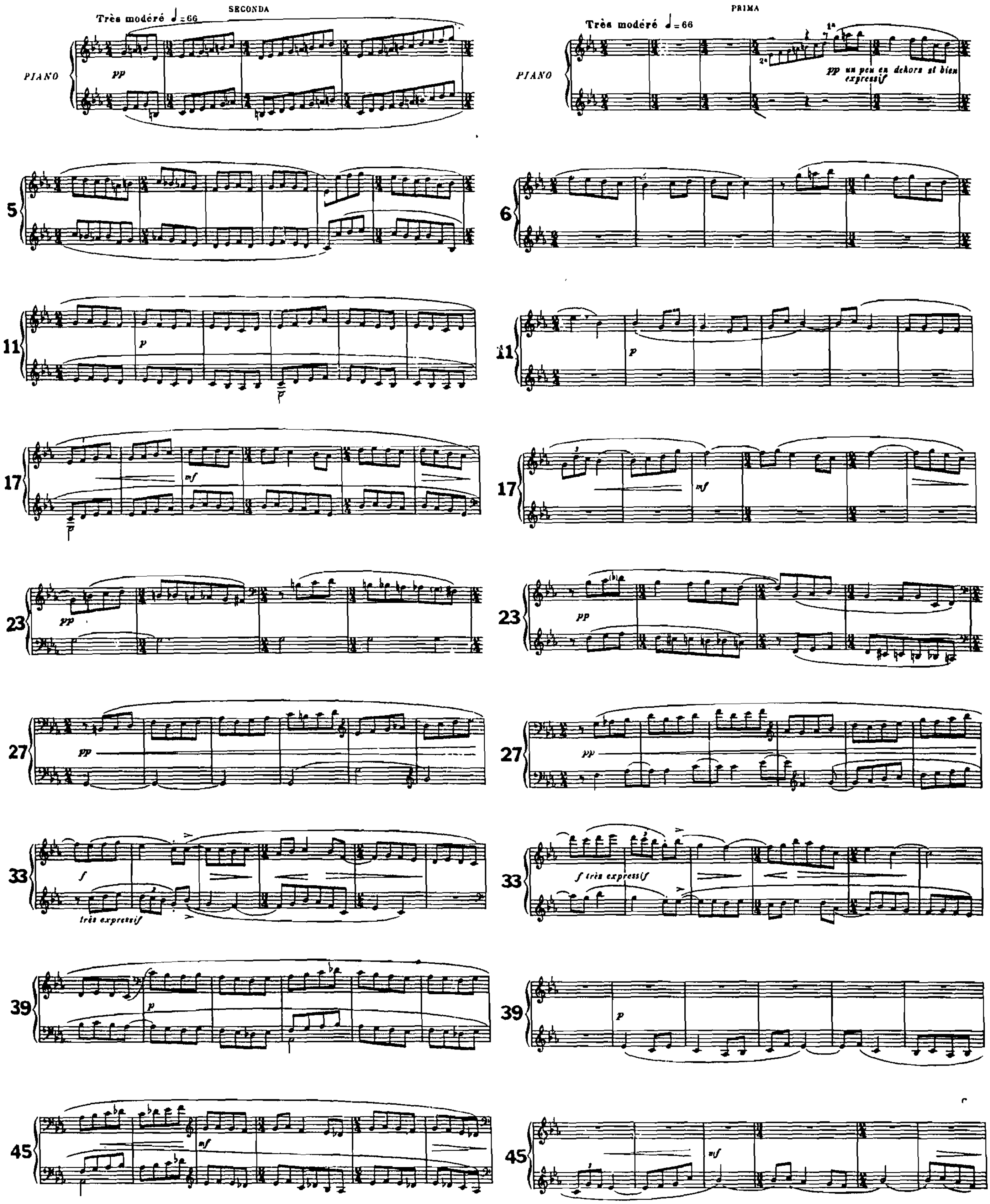


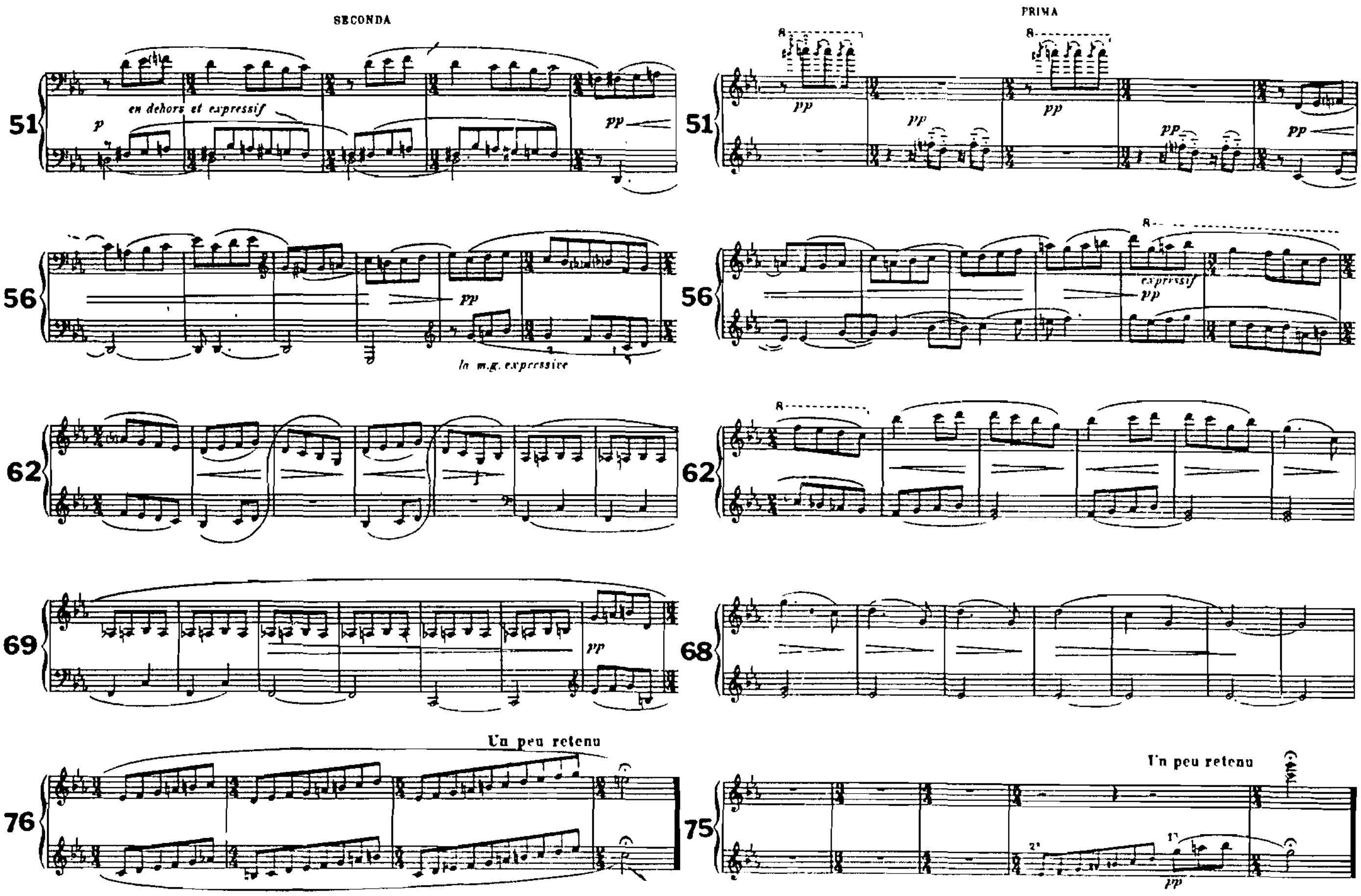
It is hard to believe that the suite *Ma Mère l'oye* was first written for piano four hands, because it sounds so completely natural in the orchestra. However, as has been mentioned before, most of Ravel's orchestral music was originally written for keyboard. For that reason, we shall study two of his works: first, this very sensitive short work, and then excerpts from *Alborada del gracioso,* which of course is much more complex.

Petit Poucet (Little Tom Thumb) is a simple adaptation of the piano original, executed with impeccable taste and clarity. The soft background is given to the muted violins in sharp contrast to the oboe's tune. One should notice that the accompaniment, as well as the melody, is essentially an eighth-note movement; therefore, the highly contrasting colors throughout the piece are very necessary to separate the two elements for the listener. Many details are noteworthy: The background dovetails or overlaps at [1], while the melody is taken from the oboe by the darker-hued English horn without overlap and a fresh articulation. The slurring pattern of the violas and cellos remains regular throughout the rather imaginative phrasing of the solo instrument. The sustained G, softly accented by the double basses' pizzicato, is held by the clarinet into the next measure, an effect comparable to that produced by the damper pedal on the piano. In the orchestra version, Ravel is especially careful to

Example XVI–12. Ravel, *Ma Mère l'oye*, "Petit Poucet" (entire piece)

a. Piano 4-Hand Version





b. Orchestral Version




5
Hb
Vons
Alt.
Vlles
C.B.
12
Cor A.
Cl.
p expressif
1°
Vons
Sourdines
Alt.
Sourdines
Vlles
Sourdines
pizz.
C.B.
mf
20
Gde Fl.
Cor A.
Cl.
Cors
1° Solo
1° Solo
Sourdines
pp
Vons
Alt.
Vlles
C.B.


27
Gdes Fl
Htb
Cor A.
Cl.
Cors
Vons
Alt.
Velles
C.B.
f très expressif
arco
pp
35
2de prenez la Pte Flûte
p expressif
42
Bons
1o
pizz.
mf


50
Cor A.
Cl.
Bons
Cors
sans Sourdine
Solo
sans Sourdine
sur la touche
Sourdine
Tutti
Alt.
arco
C. B.
Div
55
Gde Fl.
Cor A.
jeu ord.
Unis
ôtez la Sourdine
sur la touche
pp expressif
Tutti
Unies


61
Bons
Sourdine
Sourdine
Alt.
Sourdine
Tutti
C.B.
67
Solo
Div.
pizz.
Arco
74
Un peu retenu
Un peu retenu
4 Altos Soli
C.B.

notate even the slightest details of articulation as well as decay and cessation of a pitch. It is interesting to see how the composer changes both fore- and background color with each new entrance and how the background sometimes overlaps, while other times there is a new articulation to the phrasing. This makes for a very sustained effect such as that notated in the *secondo* piano part by an unbroken slur. Five measures before [3], we begin another orchestrated crescendo. The harmonic texture is very thin, but because of the intense register of the instruments' and the at-pitch doublings, the colors give the effect of fullness. As they descend and drop out, Ravel is easily able to orchestrate the diminuendo into the short recapitulation of the English horn theme a fifth lower than the first statement. At [5] there are four measures that go well beyond mere transcription. Over a D pedal and with the melody played by the first bassoon accompanied by the muted violas, Ravel has created an atmosphere by sophisticated subtle orchestral effects. The piano part could not possibly duplicate this unless the inside of the piano were used (which was unheard of in Ravel's time). The simple grace note (G♯–A) is replaced by a glissando of harmonics from F♯ chromatically to the A (a characteristic device used by Ravel in many of his transcriptions). An ornament such as a grace note is often varied and extended to give a more coloristic effect. The *sul tasto*, glissando, and tremolo in the first and second violins and cellos add great mystery and a momentary unreality to the rather straightforward atmosphere that has existed thus far in the piece, and will also bring the piece to a close. Study the piccolo part imitated by the second and third solo violin trills, which are quite different from the simple gesture in the piano version. The seemingly unaffected bassoon soloist, with his viola accompaniment, makes the return to a more normative orchestration quite feasible and successful. It is important to note that Ravel does not remind the listener of this strange interlude again, except that nine measures from the end, the cellos play a harmonic, and the resulting chord is similarly colored. The return from [6] to the end is orchestrated in very much the same way as the beginning, but differently colored. The combination of solo cello and piccolo is wonderful, and the contrast with the flute going into its lower regions is very striking. A clever stroke is the return of the exact opening colors for the last five measures, aided by the beautiful viola chord in harmonics.

The student is advised to study other piano-orchestra transcriptions to strengthen his technique from the knowledge gained by such analysis. Here are some recommended transcriptions:

Satie-Debussy, *Gymnopédies*
Stravinsky, *Petrushka*

Ravel, *Le Tombeau de Couperin, Valses nobles at sentimentales, Rapsodie espagnole, Pictures at an Exhibition, Alborada del gracioso*

Dallapiccola, *Variations for orchestra*, a transcription of his *The Musical Notebook of Annalibera*

Copland, *Piano Variations–Orchestra Variations*

Schuman, *America Variations by Charles Ives* (from the organ version)

Respighi-Rossini, *La Boutique fantastique*

Mussorgsky, *Pictures at an Exhibition:* Compare the transcriptions by Ravel and Stokowski.

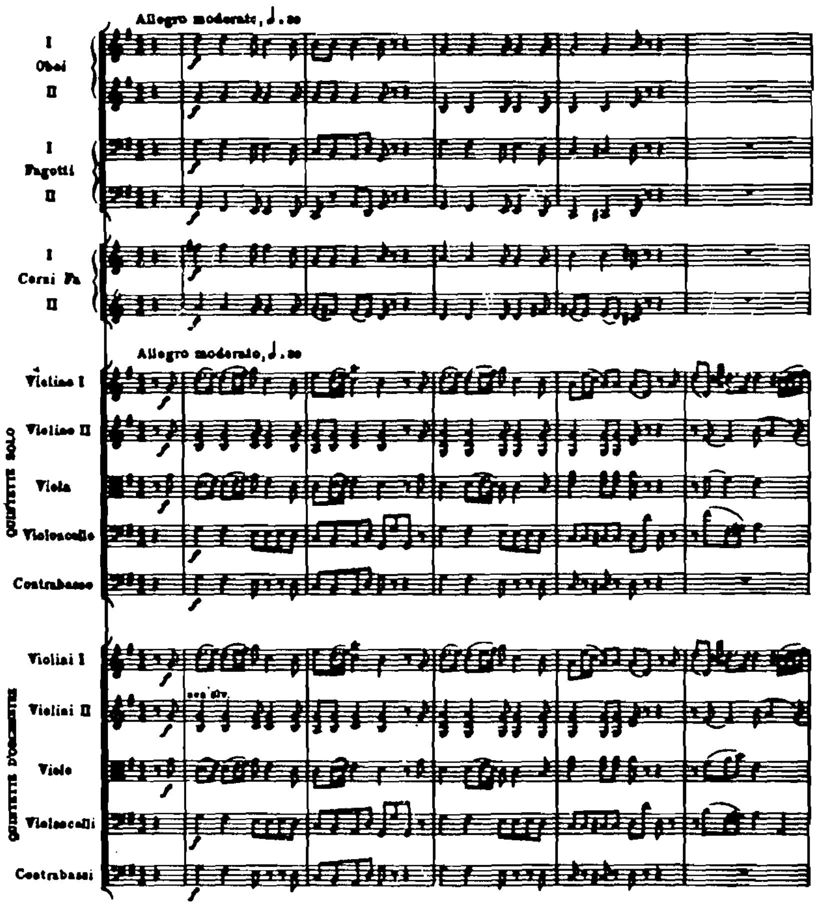
Stravinsky, one of the greatest masters of our century, had the extraordinary ability to take preexisting materials—that is, works written by other composers—and adapt them in his own works. Yet they all sound like Stravinsky. Whether the original works were by Bach, Tchaikovsky, or others, he was always able to manipulate the music so that in the end it had the Stravinsky touch. Stravinsky

Example XVI-13a. "Pergolesi" (Gallo), *Trio Sonata in G major*, first movement, mm. 1–16





b. Stravinsky, *Pulcinella*, Sinfonia, mm. 1–17





would invariably fall in love with a composer's entire *oeuvre* and study his compositional and orchestral technique thoroughly. Only after great in-depth exploration did he set about to transcribe a work based on the compositions of another master from another period.

Despite his short life span of only twenty-six years, Giovanni Battista Pergolesi (1710–36) produced a sizable body of work. Stravinsky chose as the Sinfonia for his *Pulcinella* ballet (which he later made into a suite), the first movement of the *G-major Trio Sonata* presumed to be by Pergolesi. Since that time, musiciologists have discovered that this work was not by Pergolesi, but rather by one of his contemporaries, Domenico Gallo. Nevertheless, we are able to discuss its transcription and Stravinsky's metamorphosis of it, disregarding its spurious authorship as well as Riemann's incorrect supposition. Although dealing with a secondary source, Stravinsky nonetheless captured the spirit of the period in which the piece was originally conceived and scored it in a manner that can help us do similar transcriptions if we study his methods carefully. Let us therefore try to find Stravinsky's *modus operandi*.

Having respect for the late Baroque, Stravinsky decided to score it for a combination of instruments which could logically have been employed in that time as well. Further, a duet with continuo could have been the source material for a *concerto grosso*, since the Italian Baroque masters often wrote *concerti grossi* for two violins and continuo as the *concertino* group pitted against a string orchestra (*ripieno*); at times the *concertino* group was made up of wind instruments as well. This is probably the way Stravinsky reached his choice of the instrumentation for this particular work.

As to the adaptation itself, it is rather straightforward. Stravinsky does change the notation for the sake of keeping 4/4 most of the way through. Therefore, he bars the entire piece in a manner that presents fewer ensemble problems than the trio version from the very outset. Further, Stravinsky reinterprets some of the ornaments, such as the one at the end of m. 5 in the trio version, where the mordent becomes grace notes in the transcription. He sets off the two phrases by lightening the texture of the second phrase, dropping out the winds and horns plus the double bass. It must be pointed out that the many dynamic marks in the trio version were placed there by the editor (Hugo Riemann), not by the composer; therefore, it is perfectly permissible for Stravinsky to begin the first phrase *forte* and the second *mezzo forte*, and to change the color so that when the oboe and bassoon play the solos at m. 7, their entrance is very fresh. The harmony and the little counterpoint of the bassoon are Stravinsky's realizations of the figured bass. Riemann chose to do it one way, while Stravinsky does it in a much simpler, more stylish manner, never changing the original harmony or interfering with the melody. His main concern is color change, which he accomplishes as smoothly and gracefully as possible, never breaking up a phrase needlessly, and preserving the shape of the piece. The melodies come through with extraordinary clarity.

We now examine some of the techniques Schoenberg used in his masterful transcription of the Brahms *G-minor Piano Quartet*. On the whole, Schoenberg does not change any of the harmony of the Brahms work, and except for a much greater use of the trumpets and xylophone in the last movement, he tries to give us a Brahms-like orchestral sound. One could argue about the inclusion of the E♭ clarinet, as well as the extraordinary trumpet parts, but the piece is written for the modern orchestra, and we will analyze it to learn how he deals with color distribution or substitution, and also with transcribing the very idiomatic piano part. It is obvious here, as it was in the Pergolesi-Stravinsky example, that Schoenberg loved Brahms and was intimately familiar with his compositional as well as his orchestral style. This cannot be overemphasized as a precondition for transcribing a work.

Let us study five excerpts from the score:

Example XVI–14a. Brahms, *Piano Quartet in G minor*, first movement, mm. 1–10



b. Orchestral Version by Schoenberg



The original Brahms quintet opens with piano octaves, which Schoenberg transcribes beautifully for three clarinets. In m. 4, the logical bassoon-horn combination with the two upper clarinets ends the phrase to prepare for the new entrance. As in the original, a string instrument enters. Schoenberg, instead of doubling at pitch as Brahms did, uses octaves to provide a richer sound, for he does not have two distinct colors (piano and cello); doubling at pitch, the violins and cellos would swallow each other up. The entrance of the viola in the quartet is taken by the horn to point up the upcoming violin entrance.

The switch between choirs is not only colorful, but emphasizes the pseudo-fragmented presentation of the theme in the Brahms version: two measures, one measure, two measures and a beat. Mm. 8–10 are the richest continuous orchestration thus far and reflect the original version admirably. At m. 11 a bridge passage begins and with it, an entirely new color.*

There are some important details we can glean from examining mm. 50–59.

1. The cello solo is kept intact from the original.
2. Except for the arpeggiation, the harmony in sustained chords is also retained. This technique reflects the use of the sostenuto pedal when the piano performs the passage.
3. There is no actual doubling of the middle parts until m. 53, when the oboes double the second violins and violas, signifying that the cello solo is coming to an end.
4. The violin solo is also kept intact, with sustained as well as arpeggiated harmony.
5. Notice the handling of the arpeggiated triplets. In m. 54–57 they are played as solid chords, then for one measure they are arpeggiated in order to lead smoothly to m. 59, where, as in the original, both the violin and cello play triplets in that manner.

We have chosen one big tutti spot—mm. 75–77—to show how Schoenberg scores the alternation between the piano and strings in the original. He only adds *secco* chords at the beginning of each measure; otherwise, he simply orchestrates what Brahms wrote. Notice, however, the un-Brahmsian trumpet part, which gives an extra sting to the winds. The leanness of the texture (essentially two-part) makes the color and the big chords very successful.

Now, two excerpts from the exciting last movement, where one could argue that the xylophone and the big battery are a bit excessive, but since we are dealing with "Hungarian" or "Gypsy" rhythms and tunes (the movement is called *Rondo alla Zingarese*), one may contend that Schoenberg was trying for the cimbalon sound with the xylophone.

Compare, in mm. 874–92, the figuration of the piano part with the very clever, idiomatic orchestration, first in the strings (mm. 874–76), then in the winds (mm. 877–79). It is interesting that Schoenberg here introduces a completely new rhythm in the timpani, which lends great excitement to the crescendo. In m. 880, the orchestrator is doing a bit more than simply transcribing the score; he adds a nice counterpoint made up of the pitches found in the

* From this point on, the reader is referred to the scores of the work being discussed.

measure, but having its own rhythm. This "countertheme" continues to enrich the texture to m. 891, first in the second horn and the bassoons, then in the violas—a beautifully orchestrated section.

The cadenza in m. 1106A is a very complicated spot that warrants careful study. Schoenberg thoughtfully bars the "free" piano notation in sextuplets for the E♭ clarinet, while solo strings and low flutes provide the "residue" of pitches that would result if the pianist were to sustain the entire run with the pedal. It would be very dissonant; therefore, clusterlike chords result, but by the time the low strings finish the run at m. 1106J, one is left with a thrilling and most unusual impression.

It is urged that the student become more familiar with this fascinating score and study it carefully, always comparing the original with the transcription.

TRANSCRIBING FROM BAND TO ORCHESTRA

The transcriber is confronted here with two large organizations, one of definite and one of indefinite size. We all know that the complement of an orchestra is whatever the composer specifies. Except for the exact number of strings, one can be confident that if one writes for two flutes, exactly two flutes will play the part. Not so in the average band. If one writes three clarinet parts, there may be as many as fifteen clarinet players on each part. During the last thirty years, we have seen the development of the wind ensemble, which differs from the band in that there is only one player on a part, unless otherwise specified by the composer. In music for band, the composer is justified in writing the word *solo* in the first clarinettist's part, for there may be any number of clarinets performing the same part. This does present problems in transcription, and this potentially massive sound should be kept in mind when attempting a transcription from band to orchestra.

We must remind the student once again that the two media have their own peculiar sounds, and no orchestra can be made to sound exactly like a band nor vice versa in any transcription. The argument whether a certain piece sounds better in its band or orchestral version is purely rhetorical, for it depends on the taste of the composer, the performers, or the audiences. It is a moot question to argue whether *Elsa's Procession* by Wagner should still be performed in its band version, for the question should be: If there are no orchestras around, is it not better for the players and the audience to have experienced some of these great works of the past in band transcriptions than never to have heard them at all? On the other hand, if we do transcribe from one medium to another, let us be sure it is accomplished in the best of taste and without loss to the musical content of a work or the basic concerns of the composer as to the quality of

each sound. Quality in this context means a sensitive realization of the dynamics, implied colors, and emotional "feel" of a sound or a section.

In examining the following three transcriptions, which were all made by their composers from band to orchestra, let us dwell on the following considerations:

1. How much of the band orchestration was kept in the transcription, and how did the composer's attitude change toward some or any portion of the work?
2. Were there significant substitutions in the solo voices from one medium to the other? Why? Is there any perceivable logic to this change?
3. How were the band instruments that are absent from the standard orchestra handled in the orchestration? What role did the strings inherit?
4. As in piano-to-orchestra transcriptions, were any changes in notation necessary?

Although we have concentrated on the orchestra in this book, you should be able to apply all the observations and techniques *in reverse*, when called upon to transcribe an orchestral work for band or wind ensemble.

Example XVI–15. Milhaud, *Suite française*, second movement
a. Band Version (mm. 25–35)



b. Orchestral Version (mm. 25–36)

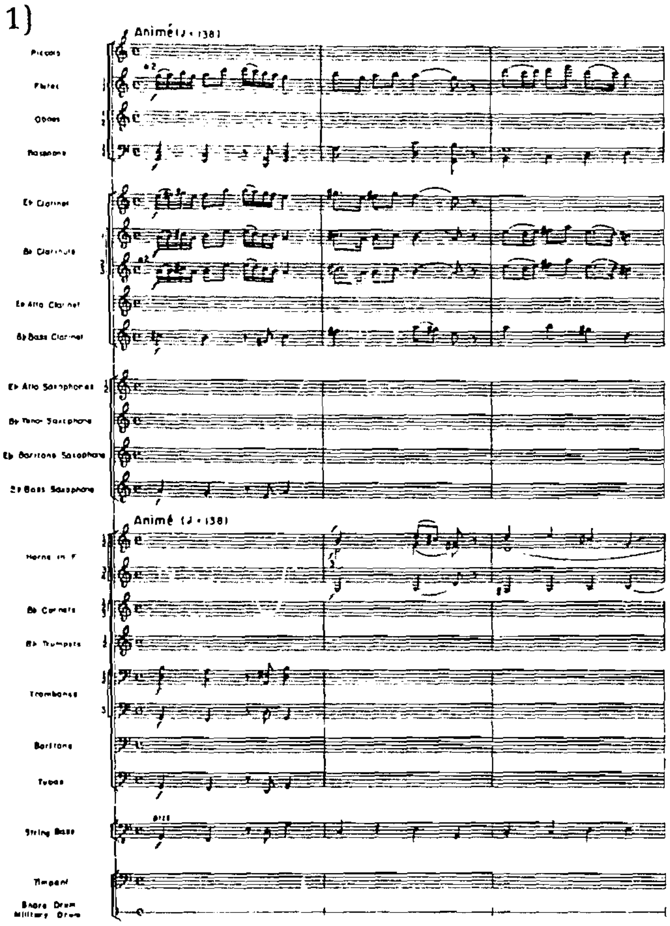


Both the band and the orchestral version of Darius Milhaud's *Suite française* were written to be played by high-school groups. Therefore, Milhaud took great care to minimize all technical difficulties and control the range of the individual instruments.

1. It is fair to say that although both versions have a great deal of Gallic flavor, the band version is definitely heavier, sometimes even massive, while the orchestral transcription has a chamber-music quality.

Example XVI–16, Milhaud, *Suite française*, fifth movement

a. Band Version (mm. 1–11)





b. Orchestral Version (mm. 1–10)



2. The band version sustains the same or similar colors for a long passage, while in the orchestral transcription, there is constant alternation between choirs, thereby providing much more coloristic variety.

Example XVI–17. Milhaud, *Suite française*, fifth movement.
a. Band Version (mm. 50–57)



b. Orchestral Version (mm. 51–60)



3. Aware that many high school wind players are more seasoned than their string-playing equivalents, the composer doubles the lower octave, letting the flutes carry the upper one by themselves. Here, as in many other places, he leaves out the brass in the orchestra and saves it for the significant entrance at m. 57. A similar lack of high partials is the case where Milhaud wants to save the flute for the entrance at m. 50, but fears the violins could not play that high. It certainly gives this passage a flavor different from the band version.

4.* Let us now look for some more small details which could help us if we were asked to do such a transcription:

a. Third movement, mm. 62–67: The muted trumpet, aided by the first violins, makes a beautiful substitution for the alto clarinet–alto saxophone solo.

b. Fourth movement, mm. 25–42: The muted cornet is transformed into an oboe-viola combination, and when the "open" cornet takes over, a muted trumpet is added to the oboe-viola mix in the orchestral version.

c. Fifth movement, mm. 15–30: It is strange that in the orchestral version the piccolo is not used where it is so effective in the band, as it is here.

d. Third movement, mm. 26–38: At times, there is some lovely rethinking for the transcription. For example, flute, oboe, and clarinet become flute, clarinet, and first violins; then piccolo and muted cornet become flute, oboe, and violins.

Now we come to the most complex of the three pieces, Arnold Schoenberg's *Theme and Variations*, Op. 43A and B, because Schoenberg's orchestral version is more a recomposition of the band version than either of the other works. He did not simply substitute strings for the nonorchestral instruments, but radically changed colors to make the two versions sound completely different. To give a few brief examples:

*From this point on, the reader is referred to the score of the work under discussion.

Example XVI–18. Schoenberg, *Theme and Variations*

a. Op. 43A (Band), mm. 1–5



b. Op. 43B (Orchestra), mm. 1–5



Example XVI–19. Schoenberg, *Theme and Variations*

a. Op. 43 A (Band), Variation I, first 4 measures



b. Op. 43B (Orchestra), Variation I, first 4 measures

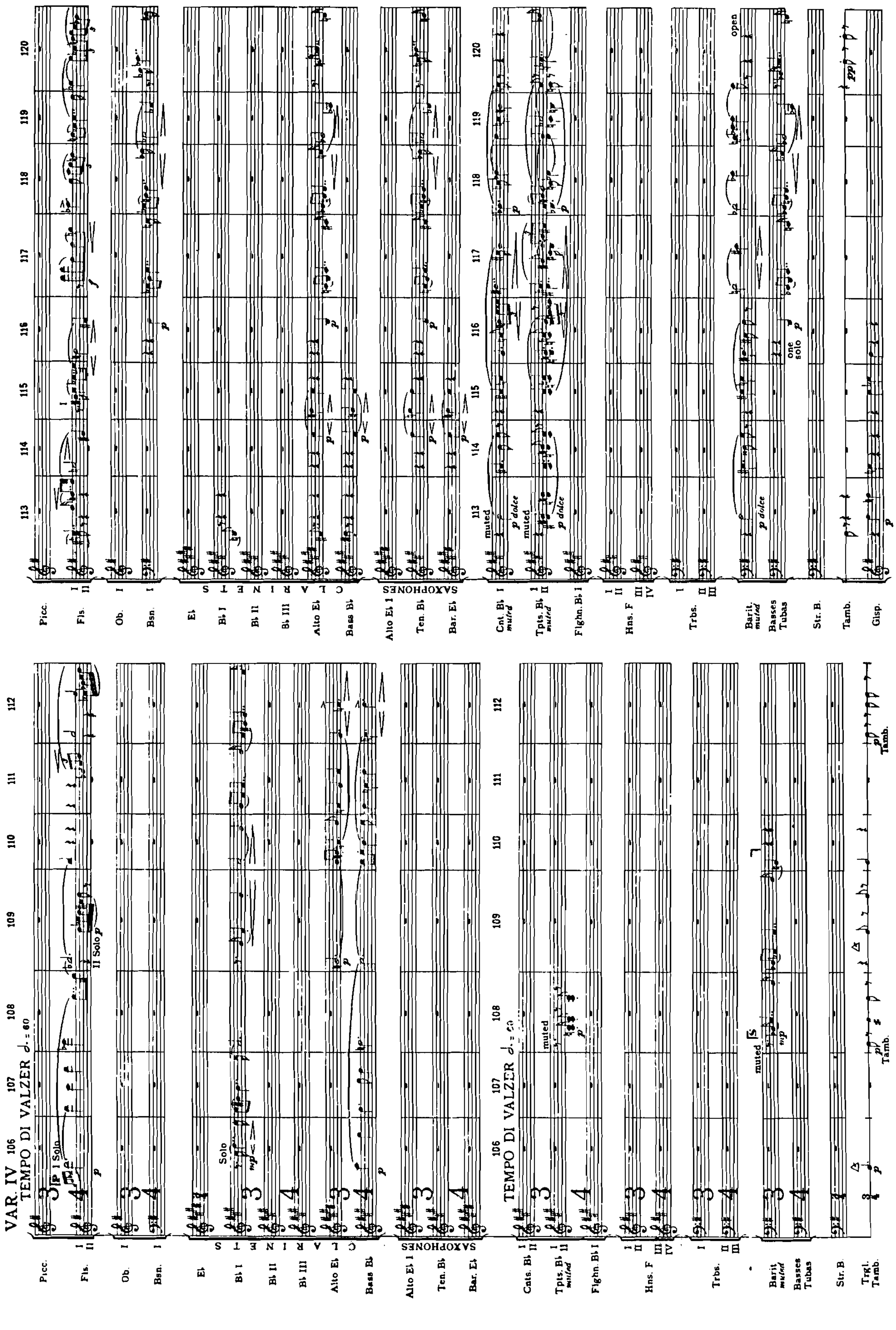


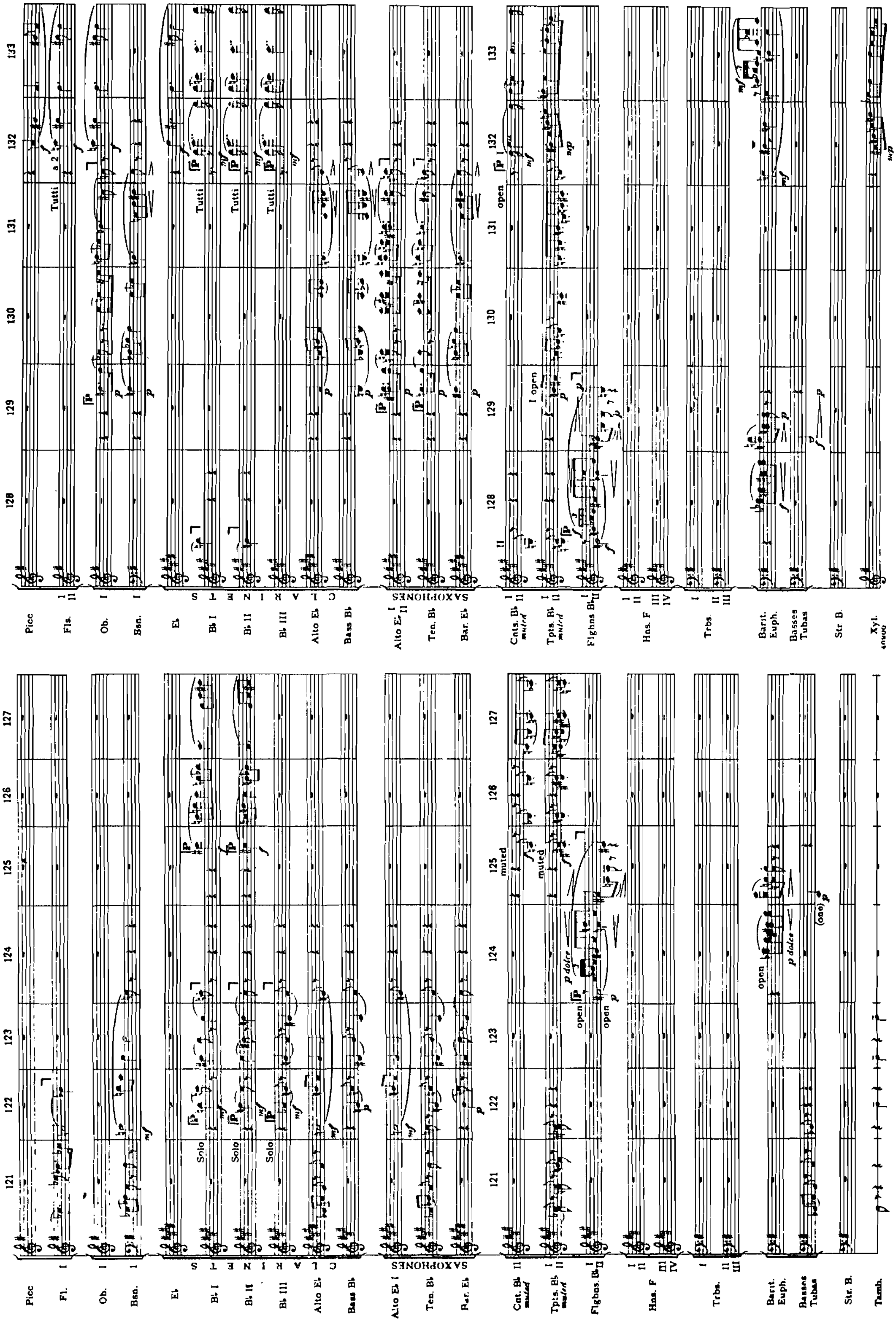
The very opening of Example XVI–18 replaces a typically thick band color of clarinets and oboes in unison with the clear solo voice of a trumpet; even more important is the radical change in dynamics—*forte* for band, *piano* for orchestra. This naturally has immediate consequences in the first variation: the oboe substitutes for the trumpet, which then becomes the principal voice, although it was not marked thus in the original version. (See p. 550.)

The muted upper strings and pizzicato cellos and basses in Variation I (see Example XVI–19) have a much "softer" color than the clarinets, euphonium, cornets, horns, and saxes. An attitude of greater delicacy in the orchestra pervades the entire transcription, and forces one to admit that the band version is much more "gutsy." There is no doubt that this change of emphasis was deliberate on Schoenberg's part. Knowing what a fine orchestrator he was, we are certain that he could have simulated and mirrored the band quite readily in the orchestral transcription. Therefore, this is an excellent work in which to observe at least two different ways of expressing the same musical idea. Let us study one other variation in greater depth.

Although the flute solo in Variation IV was transferred intact, it is interesting to examine the "toned down" accompaniment in the orchestra. The clarinet, muted trumpets, and baritones were replaced by solo strings muted or tutti playing *col legno battuto* (mm. 106–13). Then, with the trumpets resuming their original role, solo strings continue their extremely soft accompaniment instead of the much more piercing muted cornets and baritones. At the end of the flute solo (m. 122), the clarinet color is replaced by an oboe–English horn combination and the alto clarinet–alto saxophone mix assigned to a muted trombone. Remember that a section in a band may consist of a multiple of instruments playing a solo part; this would necessitate heavier accompaniment scoring for that, if for no other reason. It is noteworthy to examine the "fluttering" figures which Schoenberg invents in mm. 122–23 of the orchestral version. These have no equivalent in the much more straightforward band setting. Then we observe a drastic change of color in the orchestra when the flugelhorn's theme is played by the low flute and the high bassoon and the baritone-euphonium part is given to the very soft clarinets (mm. 124–25). Strangely enough, this is followed by two measures of exact transcription and a return to the color of mm. 124–25. In m. 129, we feel the lightness that Schoenberg wishes to convey in the orchestra, for the trumpet is kept muted and the oboe melody not doubled. Then (mm. 132–39) we have a wonderful exchange of high and low tessitura when the flutes and clarinets, doubled in the lower octave by the second violin, play the first loud phrase, followed by the violins in the upper register, while the winds double at the lower octave. This is certainly a much more sophisticated and less piercing

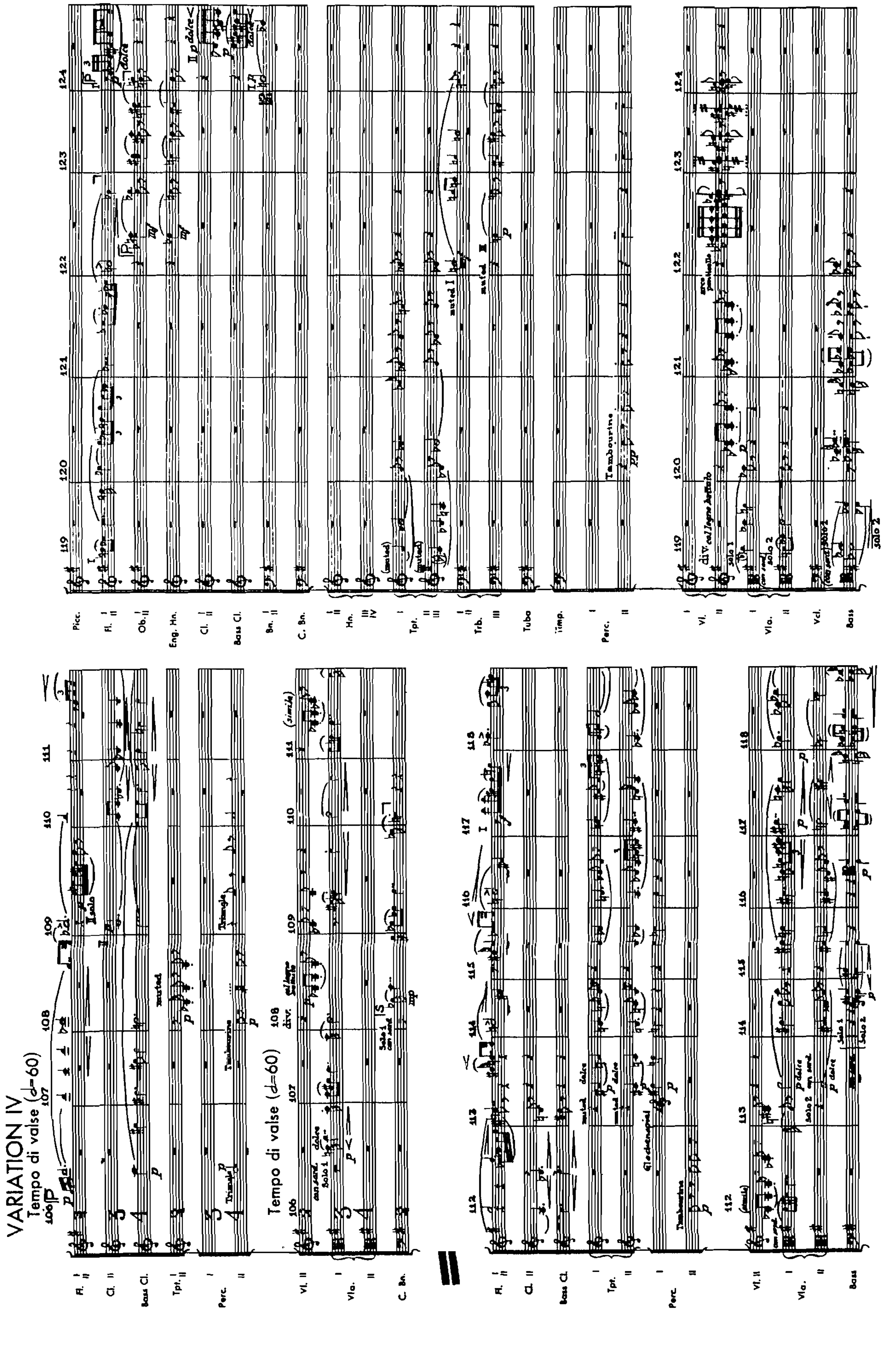
Example XVI–20. Schoenberg, *Theme and Variations*
a. Op. 43 A (Band), Variation IV




Picc
Fl.
Ob.
Bsn.
CLARINETS
E♭
B♭ I
B♭ II
B♭ III
Alto E♭
Bass B♭
SAXOPHONES
Alto E♭
Ten. B♭
Bar. E♭
Cnt. B♭ muted
Tpts. B♭ muted
Flgbns. B♭
Hns. F
Trbs.
Barit. Euph.
Basses Tubas
Str. B.
Tamb.
Xyl.
Solo
muted
open
Tutti
p dolce


Picc.
Fls
Ob.
Bsns.
CLARINETS
Alto E♭
Bass B♭
SAXOPHONES
Ten. B♭
Bar. E♭
Cnts. B♭
Tpts. B♭
Flghn. B♭
Hns F
Trbs.
Barit. Euph.
Basses Tubas
Str. B.
Xyl
Timp.
Trgl.
Glsp.
RIT.
p dolce
Tutti
open

b. Op. 43B (Orchestra), Variation IV





muted
I(open)
I(muted)
(muted)
Xylophone
tutti
senza sord.
Tutti
div.
open
Glockenspiel
Triangle
rit.
(rit.)
pizz.
dolce

solution than we find in the original score. Both versions end the variation in a similar manner, except for the violas, which provide a much softer sound than the original flugelhorn. The muted lower strings bring about the beautifully peaceful close.

*Variation VI (the fugue) will certainly verify the statement that the band version is more "gutsy." The orchestral version begins with the violas stating the subject; in the band there is a thrilling brass combination of open horns and baritone. Instead of bringing in another heavy brass combination, Schoenberg leaves the second statement to the first trumpet; however, that means several trumpets will play it, and that can hardly be compared to the second violin color. Nevertheless, let us remember these are two separate works, and the balance of the two strings is fine in the orchestra, while the brasses are well balanced in the band; as we said, the emotional impact is different. Meanwhile, the brass chords are taken by a rather effective double-reed combination. The pseudo-stretto entrance in mm. 176–77 is truly softened in the orchestra. While in the original the heavy bass color of trombones, baritone saxes, bass clarinets, and bassoons hold forth, in the transcription only the cellos mark the entrance, with the winds coming in with a rather undistinguished color, when compared to the winds in the band (mm. 177–80: high clarinets and alto sax, plus flugelhorn). The next few measures are fairly similar in strength, though the violin pizzicatos in m. 181 are no substitute for the power of the trumpets. At m. 182, Schoenberg drops out the brass except for the horns for a couple of measures, and has the strings take over the high wind parts; this provides a great freshness for the tutti reentrance of the winds in m. 186 and the buildup of the brass from m. 184 to m. 189. The high horns in the orchestra, as substitutes for the entire brass body of flugelhorns, horns, baritones, euphoniums, lower saxes, and clarinets, are quite thrilling, although a good deal lighter.

Study the rest of this marvelous piece on your own. You can learn a great deal about orchestral and band colorations, substitutions, and sensitive alterations, all of which will increase your techniques in dealing with the orchestral as well as the band medium.

TRANSCRIBING TO VARIOUS INSTRUMENTAL COMBINATIONS

We come perhaps to the most important section for many of us who are called upon to transcribe orchestral works for performance by groups, especially school ensembles, which do not always have

*The reader is now referred to the scores of the work under discussion.

the full complement of orchestral instruments demanded by a particular score. There is no reason why a great many orchestral, chamber, or piano works should not be adapted to meet the special circumstances in which we may find ourselves. It is very important to expose young people to good music which they can enjoy performing. To transcribe any work, especially a standard orchestral work, to meet the requirements of an often bizarre ensemble may tax our orchestrational skill to the limits. We must not only be aware of the heterogeneous nature of the available instruments, but we need to be conscious of the limited skills that each player brings to the group. These conditions, should, however, only spark our imagination rather than constrain us. For no matter how far-fetched the ensemble, we must be able to include each person present in our transcription.

How does one go about such a task?

1. Reduce the orchestral work to a piano score. If it is a very complex work, a piano four-hand or two-piano score will be even more helpful.
2. Carefully designate the sections as tutti, half tutti, soli, or solo.
3. Label the solo instruments and determine whether you have an adequate player in the group. If a substitution is called for, you may want to choose an instrument that closely approximates the original one, or a combination of two instruments that give a similar result. On the other hand, if this is not possible because of the limited choices you have available, select an instrument that possesses the range as well as the dynamic possibilities suitable to the solo.

There is no reason for rejecting a work for transcription to any medium because, for example, it contains an English-horn solo which simply would not sound right on any other instrument. We must come to grips with the fact that our transcription will of necessity sound differently from the original, but if we follow the steps outlined above, if we respect and love the piece we are adapting, and most of all, if we know the piece well both formally and orchestrally, we will be able to get satisfactory results with our transcription.

If there is a good pianist available in the group, he certainly should be used. However, do not commit the error that so many of us remember from our primary-school experiences, where the pianist played the reduction of the entire piece from beginning to end. Use the piano as just another orchestral instrument: to lend body to tutti sections, to provide arpeggiated accompaniments when called for, to render the harp parts, and to take occasional single line solos, or couple solos, doubling them in the higher registers.

Usually there is a percussion player present who should be used, but only where the music absolutely calls for it. Remember, percus-

sion can obliterate an orchestra; it can do no less for a small group if it is not judiciously handled.

Two important "housekeeping" items for the score. Most amateur performers have problems with extreme ranges. There is an appendix at the end of this book where you will find the approximate, comfortable instrumental ranges for nonprofessionals. We hope that this will be helpful, for if you go much beyond those, your transcription, no matter how brilliantly executed, will not work. Most of the upper portions of the registers on most instruments will cause difficulties, but there are some on which the very lowest notes are problematical as well. This is the case for the flute, oboe, bassoon, horn, trumpet, tuba, and their auxiliaries.

Many orchestration books supply a list of substitution instruments, but that is really too limiting for our purposes. We would prefer that you experiment with the many possibilities and use the knowledge gained from analysis and listening, to decide which is the best substitute. Consider the range, the quality of the sound, and the given register, and what is most important, the skill of the player for which the part is intended.

Let us now invent a typical situation with which we may be confronted in a school or community, and solve it, transcribing a portion of three diverse pieces for our ensemble. After studying these examples, which of course present only one possibility among a great number of solutions, you should be able to cope with similar cases, as well as solve the transcription exercises in the workbook. We shall transcribe a chamber music work and an overture originally written for full orchestra. In each case the original is given.

One further caution: if one has a choice of a work to transcribe, it may be advisable to choose relatively unknown works on two counts: 1) the participants won't feel obliged to compare the transcription with the original, to the former's detriment; 2) performers should be exposed to the vast literature of the past and present which, for one reason or another, has not been widely disseminated.

Here is our fictitious ensemble and the relative technical proficiency of each player or section:

2 Flutes, both rather good *
3 Clarinets in B♭, first very good, others fair
1 Alto Saxophone, quite good
2 Trumpets in B♭, fair
1 Euphonium, very good
1 Timpani (3 drums), not too quick
1 Percussion player; counting is not his greatest strength

* Please refer to Appendix A1 for instrument ranges (nonprofessional).

5 First Violins; 3 excellent to fifth position, 2 good to third position
4 Second Violins; all rather mediocre, not beyond first position
3 Cellos, the first is excellent, the other 2 mediocre
1 Double bass, not too proficient

This is probably a fairly typical cast of characters, and the gaps are quite usual—no double reeds, no horns, and no violas. There may be a trombone or two, and even a tuba, but all these instruments could be easily accommodated, and in setting quite stringent limitations for our present purpose, the ensemble above will serve.

Example XVI–21. Schumann, *Piano Quintet*, second movement, mm. 1–16
a. Original Version



b. Orchestral Version

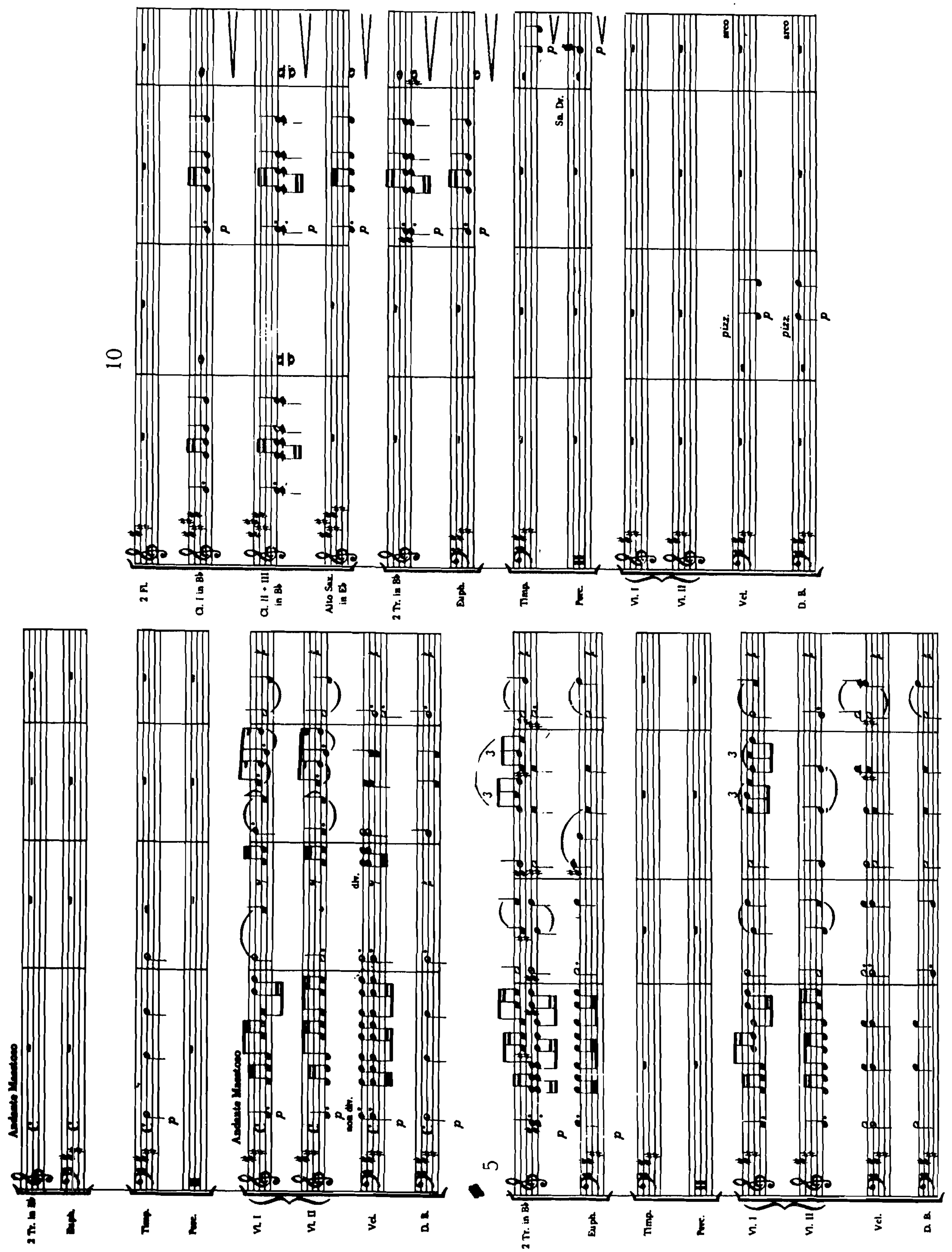




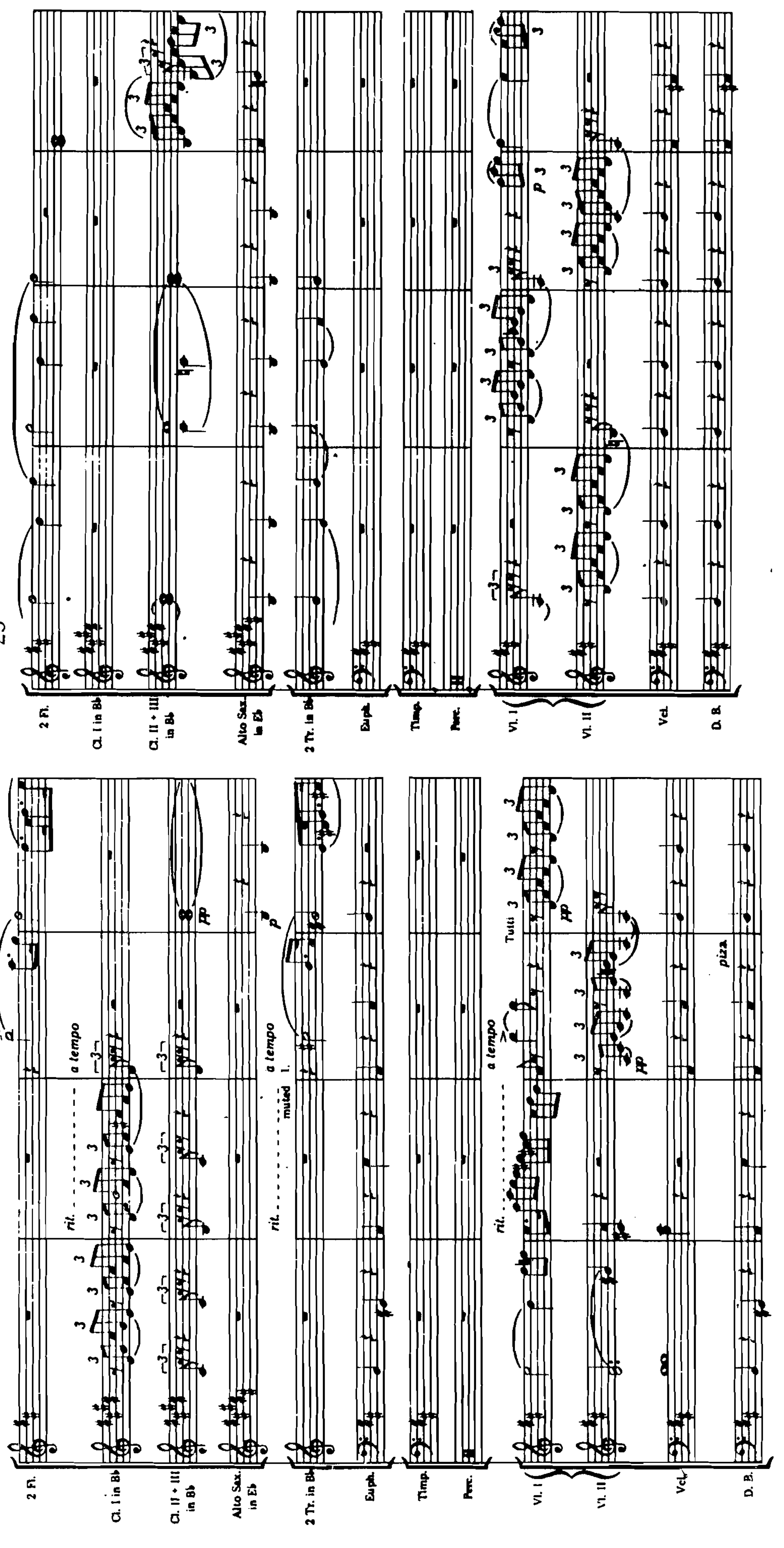
Example XVI–22. von Suppé, *Poet and Peasant Overture*, mm. 1–35
a. Piano 4-Hand Version

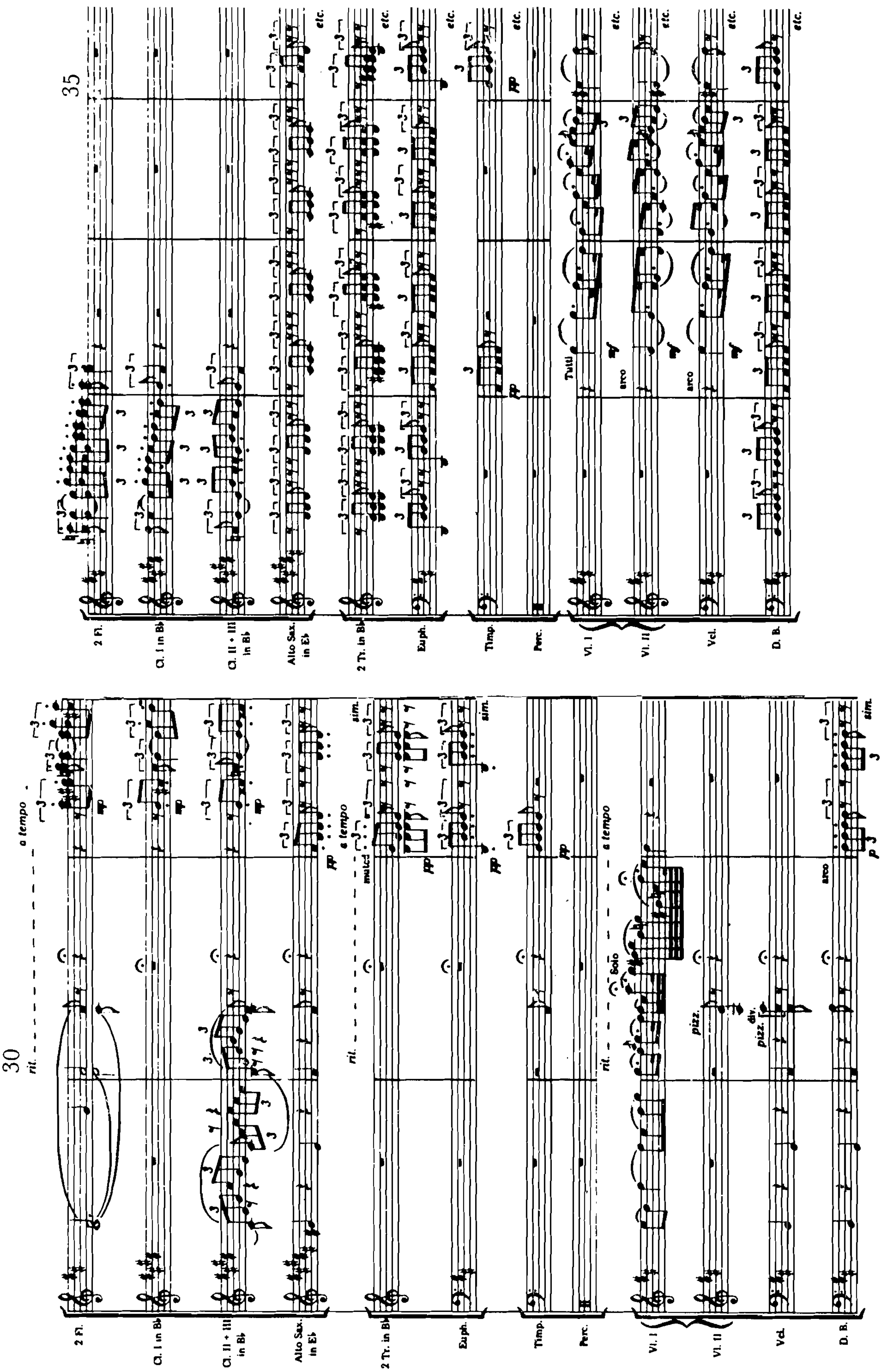


b. Orchestral Version




15
20
2 Fl.
Cl. I in B♭
Cl. II + III in B♭
Alto Sax. in E♭
2 Tr. in B♭
Euph.
Timp.
Perc.
Cymb.
Vl. I
Vl. II
Vcl.
D. B.
Solo
Tutti
div.


2 Fl.
Cl. I in B♭
Cl. II + III in B♭
Alto Sax. in E♭
2 Tr. in B♭
Euph.
Timp.
Perc.
Vl. I
Vl. II
Vcl.
D. B.
rit.
a tempo
muted
1.
Tutti
pizz.
25


30
rit.
a tempo
2 Fl.
Cl. I in B♭
Cl. II + III in B♭
Alto Sax. in E♭
2 Tr. in B♭
muted
Euph.
Timp.
Perc.
Vl. I
Solo
Vl. II
pizz.
Vcl.
div.
arco
D. B.
sim.
35
Tutti
etc.

Additional orchestral transcriptions to study:

Bach-Casella, *Ciaconna* (Milan: Carisch, 1936)
Bach-Kenovsky, *Organ Toccata and Fugue in D Minor* (Orchestration by Henry Wood)
Bach-Walton, *Sheep May Safely Graze* (Oxford: OUP, 1934 / 1943)
Debussy-Henkeman, *Twelve Preludes* (Amsterdam: Donemus, 1970)
Debussy-Ansermet, *Six épigraphes antiques* (Paris: Durand, n.d.)
Fauré-Rabaud, *Dolly Suite* (Paris: Hamelle, n.d.)
Sweelinck-Mul, *Mein Junges Leben Hat ein End* (Amsterdam: Donemus, 1961)
Schubert-Weiner, *Grand Rondeau*, Op. 107 (Budapest: Editio Musica, 1961)
Shostakovich-Kelemen, *Eight Preludes*, Op. 34 (Henry Litolff-C.F. Peters)

17

The Orchestra as Accompanist

The writings of the ancient Greeks tell us that in their time, instrumental music was used only to accompany dance, drama, or song or simply to imitate the human voice. Similarly, the orchestra as an accompanying instrument considerably predates its existence as an independent body. There is more and more evidence that the Medieval and Renaissance vocal music, which we perform *a cappella* today, was in fact accompanied or doubled by a variety of instruments forming an ad hoc orchestral group. Since vocal music was by far the most important body of composed works in Western music until about 1600, instruments were relegated to the role of accompanist. With the ascendancy of opera, the shift of musical patronage from the Church to royalty, and the technical improvement of instruments, the orchestra gradually achieved greater autonomy. At the same time, its older role as the chief accompanying body for both sacred and secular vocal and choral works persisted. Throughout the seventeenth century, with the growth and development of the *concerto grosso* as well as the solo concerto, the orchestral task of accompaniment was greatly expanded, enhanced, and refined.

THE CONCERTO

Concertos have been written for all instruments, especially in the twentieth century. Previously, the piano was by far the favorite instrument for the solo concerto because it mixes relatively well with all instruments but blends with none. Therefore, it is quite easy to feature the piano with an orchestra, since it will stand out in any combination of instruments. All the other orchestral instruments must be treated with greater care and consideration, for they all have the tendency to blend into the orchestra rather naturally. Many orchestration books have stressed the idea that orchestral accompaniments should be assigned chiefly to the strings because of their "unobtrusive" character. This is a simplistic formula, and if one studies the concerto literature, it is easy to see that the facts don't substantiate this concept. There are much better guidelines we can extrapolate from the study of successful concerto orchestration of the past and present:

1. the use of dialogue;
2. separating solo and tutti by rhythmic independence;
3. assigning foreground and background roles to both solo and tutti;
4. distinct color differentiation to feature soloist;
5. consideration of the most transparent types of accompanying textures;
6. spacing and registral placement of solo vis-à-vis the orchestra.

These are six of the basic considerations that should be kept in mind in order to write an effective orchestral accompaniment to an instrumental solo work. Here are some examples from the solo concerto literature illustrating these guidelines:

Dialogue

The principle of dialogue stemming directly from the *concerto grosso* is still valid today, for it introduces the solo instrument by itself, implanting its timbre firmly in the listener's mind. In the simple Beethoven example that follows, we have the principal tune introduced by the solo violin and then immediately repeated in a radically different orchestral color. So conscious was Beethoven of the importance of contrast that even though the strings are contained in the "answering" color, they play pizzicato to add greater variety and to avoid duplication of the solo sound. (Another famous example of such a beginning is Prokofiev's *Violin Concerto in G minor.*)

Example XVII–1. Beethoven, *Romance for Violin and Orchestra,* Op. 40, mm. 1–8



Here is an example of the same principle in a piano concerto. The dialogue enhances the role of the piano as soloist, clarifies the melodic material, and aids in a clearer exposition of the form. There are literally hundreds of examples of this simple dialogue device, one of the most effective tools of the accompanying technique.

Example XVII–2. Schumann, *Piano Concerto,* second movement, mm. 1–4



See also, first movement, mm. 185–93.

Rhythmic Independence of Solo and Tutti

This is a more delicate problem, but perhaps the most crucial one to solve for accompanying purposes.

Tchaikovsky sets himself a difficult task by choosing the string orchestra to accompany the solo violin. For one thing, the range of

Example XVII–3. Tchaikovsky, *Violin Concerto*, first movement, mm. 28–37



the solo instrument is not much different from that of the first violins. Therefore, the composer has given the first violins a melodic counterpoint and the rest of the section harmonic figuration, which is quite simple and neither duplicates nor imitates the rhythmic patterns in the solo part.

A similar situation is found in the last movement of the Mendelssohn *Violin Concerto in E Minor*, where we find a radical rhythmic difference between the smooth line of the soloist and the rather "coquettish" figure of the string-orchestra accompaniment.

Example XVII–4. Mendelssohn, *Violin Concerto*, third movement, mm. 107–17



Assigning Foreground and Background Material

Example XVII–5. Tchaikovsky, *Piano Concerto No. 1*, first movement, mm. 1–17



It is interesting to note that in most successful concertos roles are frequently exchanged—the foreground material assigned to the soloist and the background to the orchestra, or vice versa.

In one of the most striking of concerto openings, the main theme of the Tchaikovsky *Piano Concerto No. 1* (see facing page) is assigned to a combination of violins and cellos, while the piano plays chords reinforced by soft, sustained harmonies in the winds.

The soloist can provide a successful accompaniment to foreground activities of the orchestra. For these purposes, it is important to use the most idiomatic figuration for the solo instrument in order to assure the best results. In the piano, the Alberti bass, or broken chord figuration, is a natural for this role. Here is an example of another solo instrument fulfilling the accompanying task excellently:

Example XVII–6. Saint-Saëns, *Cello Concerto*, mm. 447–61





See also Mendelssohn, *Violin Concerto,* first movement, mm. 335–43.
Brahms, *Violin Concerto,* first movement, mm. 110–31.

Distinct Color Contrasts to Feature Soloist

To introduce the soloist, many composers utilize a distinctly contrasting color combination. For instance, both Dvořák and Tchaikovsky, in the slow movement introductions to their cello and violin concertos respectively, begin with the woodwind choir before the string soloist enters. The solo color is therefore very fresh, even after the first movement has been heard.

Example XVII–7. Tchaikovsky, *Violin Concerto,* second movement, mm. 1–24



Example XVII–8. Dvořák, *Cello Concerto*, second movement, mm. 1–10



Two examples from Mozart concertos can teach us some other valuable lessons about color contrasts. Example XVII–9, from the *Second Horn Concerto*, shows that the heterophonic doubling of the solo instrument does not diminish the soloist's role in the least, for there is such a vast color contrast between the horn and the first violins. The rest of the strings have more subsidiary harmonic roles. Notice that Mozart never uses the orchestral horns while the solo horn is playing. These are employed only in the introduction and during interludes, so as not to interfere with the solo sound.

Example XVII–9. Mozart, *Horn Concerto No. 2*, first movement, mm. 6–63





20
Ob.
Cor. (Es)
Vl.
Vla.
B.
SOLO
Cor. pr. (Es)
30


40
Cor. pr. (Es)
Vl.
Vla.
B.
Ob.
Cor. (Es)
Cor. pr. (Es)
Vl.
Vla.
B.
50
Ob.
Cor. (Es)
Cor. pr. (Es)
Vl.
Vla.
B.
Cor. pr. (Es)
Vl.
Vla.
B.
60
Cor. pr. (Es)
Vl.
Vla.
B.

The next Mozart excerpt, taken from the final movement of his *G-major Flute Concerto,* illustrates a number of important considerations when a wind instrument is soloist:

1. A sparse accompaniment is provided for the solo runs at (A) in order to give the performer freedom.

2. Notice the color contrast at (B) where the oboes, then the solo flute and first violins play the tune. This is followed once again by solo scales, which are lightly orchestrated to give maximum freedom to the soloist.

3. The soloist is introduced by tutti at (C), but as soon as the flute enters, the orchestra is reduced drastically, for the flute is playing at the softest part of its range. The sustained D in both the horns as well as the cellos and basses emphasizes the solid return to the tonic G.

4. Mozart uses no orchestral flutes in this work, so that the solo flute will not encounter any color competition.

Example XVII–10. Mozart, *Flute Concerto No. 1,* third movement, mm. 54–94





Textural Considerations

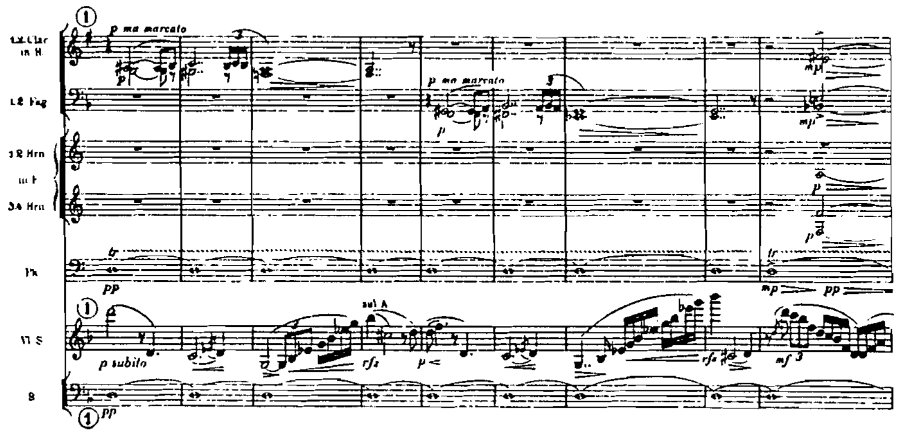
Not only must the varying timbres be considered as valid accompanying devices, but the density and transparency of the texture adds immeasurably to the effectiveness of the solo-material presentation. Here are two wonderful examples in which the solo is separated from the accompaniment in a most advantageous way. In both, the soloist is introduced to the audience in a manner that highlights

his best characteristics because of the sparse and transparent texture in which the entrance is couched.

Sibelius creates an atmosphere of expectation into which the soloist enters with a great, fresh sound. Because the accompanying texture is so ethereal, the beautiful, robust melody soars freely and is instantly perceived by the listener, since the background does not intrude at all.

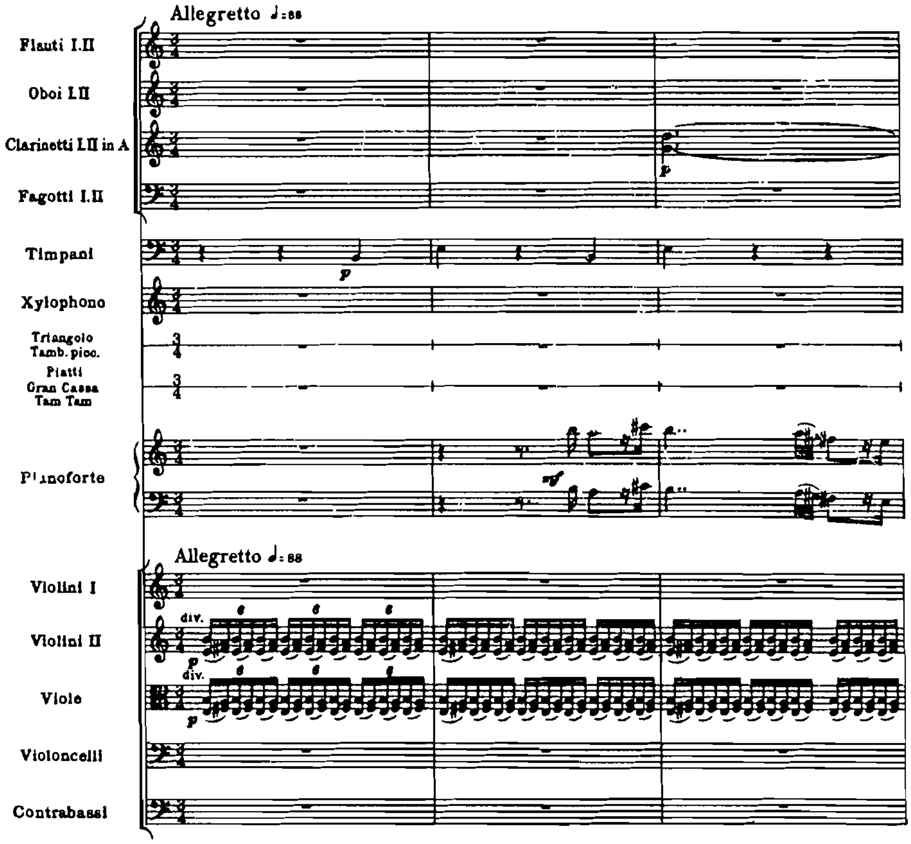
Example XVII–11. Sibelius, *Violin Concerto*, first movement, mm. 1–41





Similarly, in this piano concerto by Béla Bartók, a mood is created by the weaving strings, quietly pulsating timpani, and sustained clarinet chord, which permits the piano free rein in performing its lyrical tune. The rather illusive nature of the background rhythm also strengthens the intricate rhythmic patterns of the main melody by contrast.

Example XVII–12. Bartók, *Piano Concerto No. 3*, first movement, mm. 1–18




Clar. I.II in A
Pf.
Viol. II
Vle.
Vc.
pizz.
p
Cb.
pizz.
p
Fl. I
Clar. I.II in A
p
7
Pf.
Viol. II
Vle.
Vc.
Cb.
Fl. I
Clar. I.II in A
Pf.
Viol. II
Vle.
Vc.
Cb.


11
Fl. I
Clar. I.II in A
Cor. I in F
Pf.
Viol. II
Vle.
Vc.
Cb.
unis.
arco
pizz.
Ob. I II
17
Fag. I
Cor. I II in F
p, cresc.
dim.
cresc.
Viol. I

Spacing and Registral Considerations

Instruments other than the piano have a strong tendency to blend when used in certain registers and with acoustically sympathetic orchestral combinations. Here are a few successful and ingenious solutions to this problem from the concerto literature:

In the example below from Beethoven's *Violin Concerto*, the soloist replaces the flute in the woodwind combination, and in its most ethereal register easily dominates the situation. The timpani is very important because it plays the motive that joins the two phrases of the melody, while the harmony is provided in a most natural fashion by the other woodwinds.

Example XVII–13. Beethoven, *Violin Concerto*, first movement, mm. 99–109



In the famous "triangle" episode from his *Piano Concerto in E♭*, Liszt writes a characteristic heterophonic flute part to accompany

Example XVII–14. Liszt, *Piano Concerto in E♭*, second movement, mm. 99–104



the piano, emphasizing the most important pitches and doubling others. The triangle is also an integral part of the accompaniment, with the pizzicato strings providing the harmonic background.

Once again we quote a fascinating passage from Beethoven's *Violin Concerto,* in which the bassoon in its middle register is pitted against the solo violin playing ornamental passages. The great contrast in the rhythmic activity of the two instruments contributes immensely to the clarity of the passage, as does the simplicity of the harmony in the orchestral strings.

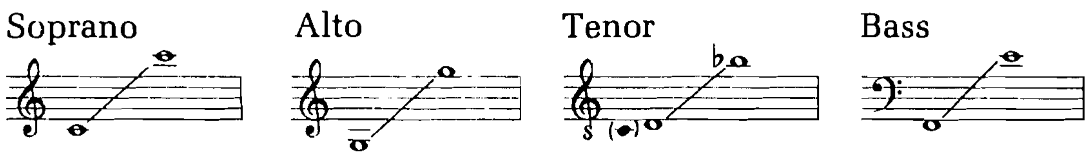
Example XVII–15. Beethoven, *Violin Concerto,* third movement, mm. 135–42

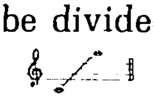


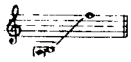
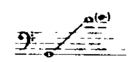
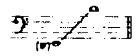
All these guidelines and considerations do not preclude the possibility of a simple accompanying figure in the orchestra providing harmony to a melody. In this very useful and popular solution to the accompaniment problem, one important fact must be borne in mind: try to keep the accompanying forces registrally distant from the soloist whenever possible. It is true that rhythmic contrast lessens the importance of this consideration. Nevertheless, for utmost effectiveness, especially when dealing with woodwind solo instruments, it is an important idea to remember.

ACCOMPANYING THE VOCAL SOLOIST OR CHORUS

Before embarking on this most important subject, let us review the ranges of the four voice types:



These are the extreme solo voice ranges. Some sopranos can go above the high C easily, and, using "chest voice," may reach a fourth below middle C. Altos can be divided into two categories: mezzo-sopranos, with a range of:  and contraltos, with a range

of:  The tenors cannot, or should not, be placed in different categories, although the quality of the voice easily separates a heavy Wagnerian tenor from a light, lyric tenor singing Mozart. The bass voice can be classified in at least two ways: the baritone, with a range of:  and a "basso profundo," with a range of:  We know there are Russian basses who are able to reach even a fourth below this lowest note.

One point of caution: remember that forcing the voice to sing over a thick orchestral accompaniment for long periods of time not only overtaxes and fatigues the singer, but often causes the vocalist to "push" his instrument abnormally, detracting from the beauty of the natural quality. Just like any orchestral instrument, the timbre and power of the register vary with each voice class; unlike the orchestral instrument, these variations differ with almost every individual. Usually the lower fifth of the range carries least well and must be lightly accompanied; the next octave is relaxed and quite forceful; the upper fifth of the range is the most powerful one. However, with many basses and contraltos, the lower part of the range carries much better than the upper portion, which can sound constricted and forced. Conversely, the upper registers of the sopranos and tenors are quite penetrating, while the lower register speaks only very softly.

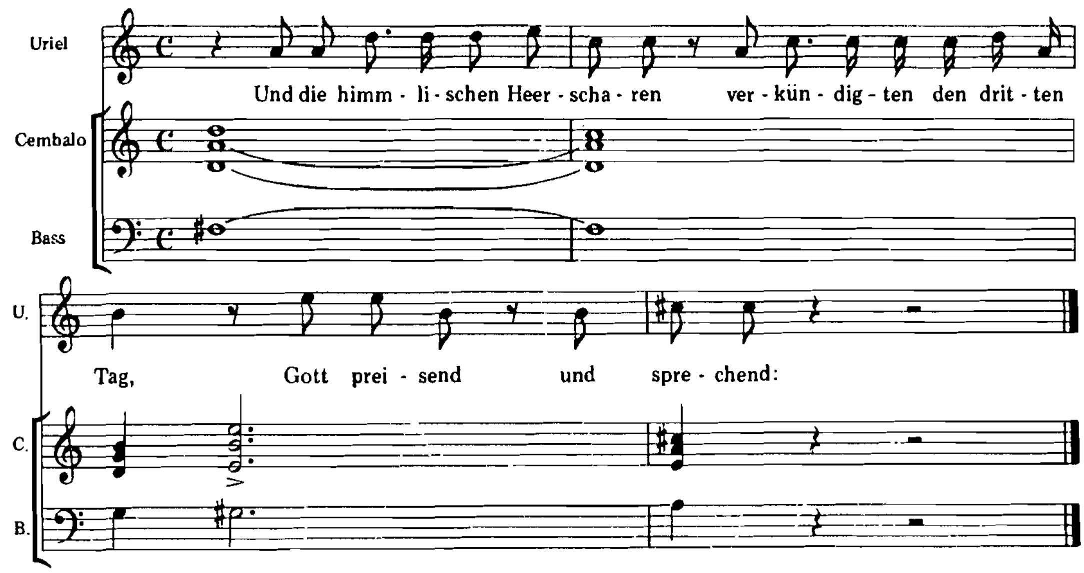
Remember that the voice is an instrument that produces pitches purely "by ear," without the aid of strings, keys, or valves. It is true that some few singers have absolute pitch, and many others "feel" the placement of tones with astounding accuracy (much as the way horn players do); but most vocalists depend for their pitch orientation on the accompaniment. With this in mind, it is essential to lead a singer to his first pitch, and from then on aid him in every conceivable way with the orchestral accompaniment, so that he will be able to maintain pitch accuracy throughout the work with relative ease. This does not mean that the voice part should be doubled at pitch all the time, but rather the singer should have important points of pitch reference as frequently as possible. The admonition is especially relevant today, when we deal with an expanded harmonic vocabulary, and it is even more crucial when writing for a chorus, which is usually made up of singers less professionally trained than soloists.

The Recitative

The recitative is the simplest vocal piece to accompany, since it usually consists of a few chords necessary to establish and then support the harmony. The most commonly used recitative types are the *secco* recitative and the accompanied recitative. Here are some examples of each:

The *secco* recitative is mostly found in the works of Bach and Handel, etc., and is simply a vocal line accompanied by a figured bass (improvised chords).

Example XVII–16. Haydn, *Creation*, No. 9



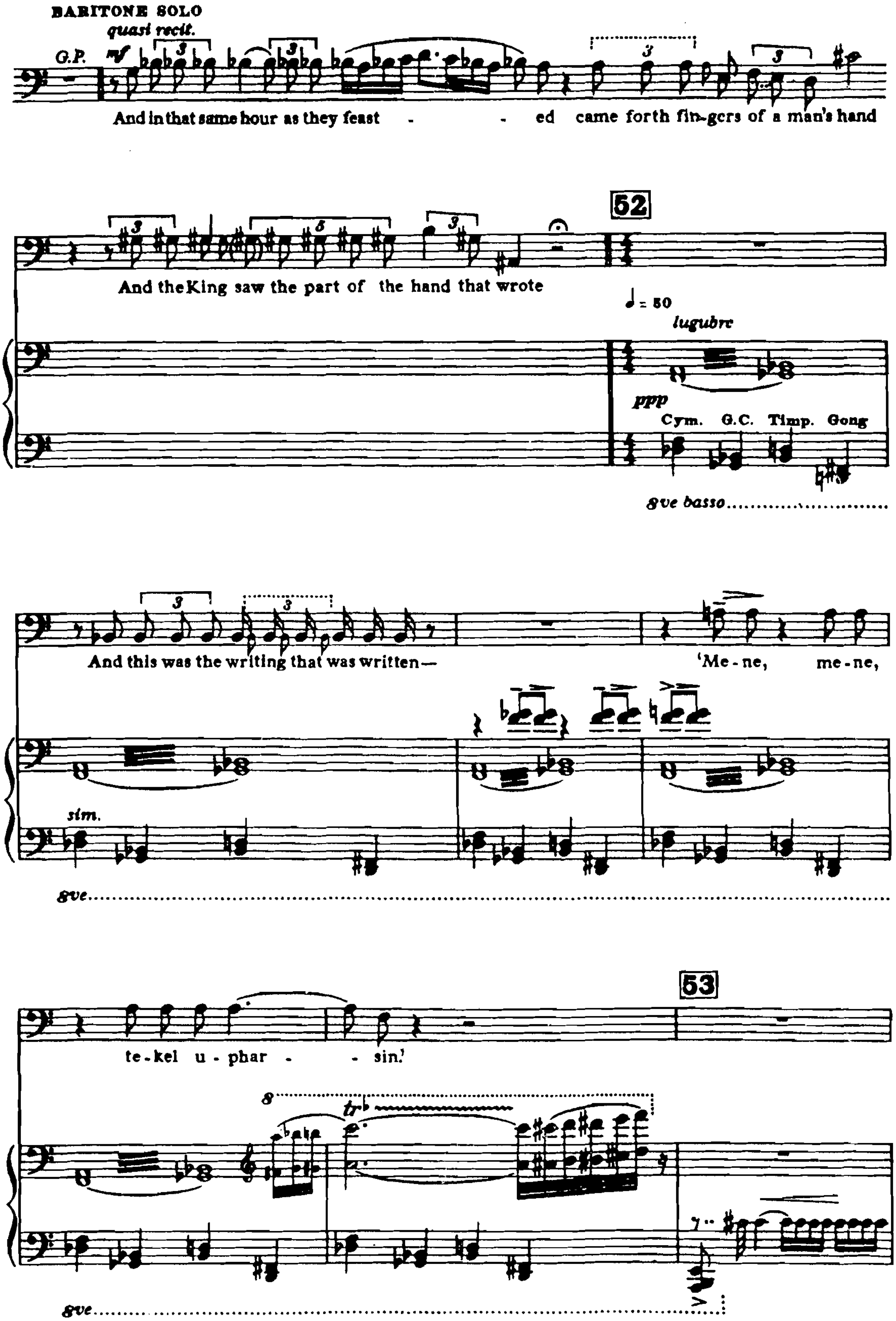
See also Bach, *Cantata No. 56* (*Kreuzstab*), "Mein Wandel auf der Welt," mm. 1–10.

The accompanied recitative also consists of chords, for the most part, but more of the orchestra is used, and often orchestral interruptions heighten the drama.

Example XVII–17. Mendelssohn, *Elijah*, No. 13: "Call Him Louder," mm. 1–11



Example XVII–18. Walton, *Belshazzar's Feast*, Recit.: "And in that same hour," mm. 1–8



See also Mozart, *Le Nozze di Figaro*, Act III, scene 4, mm. 14–40

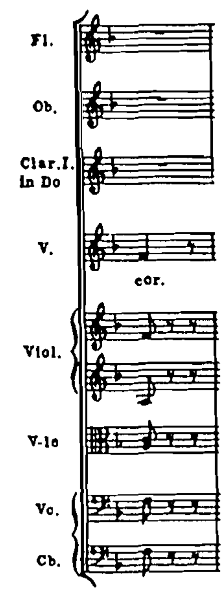
The Aria or Orchestral Song

The orchestral accompaniment to an aria or orchestral song often provides the interpretation and sets the atmosphere. This is especially true in opera. However, in many of the most successful Italian operas, composers have opted for very simple orchestral accompanying figures in order to permit the singer to project the words and emote unencumbered by orchestral interference. Here is an excerpt from Verdi's *La Traviata* which exemplifies this treatment. It is quite simple, containing a clarinet *obbligato* and sustained chords to strengthen the harmony.

Example XVII–19. Verdi, *La Traviata,* Act I, scene 3, "Ah fors' è lui", mm. 29–47



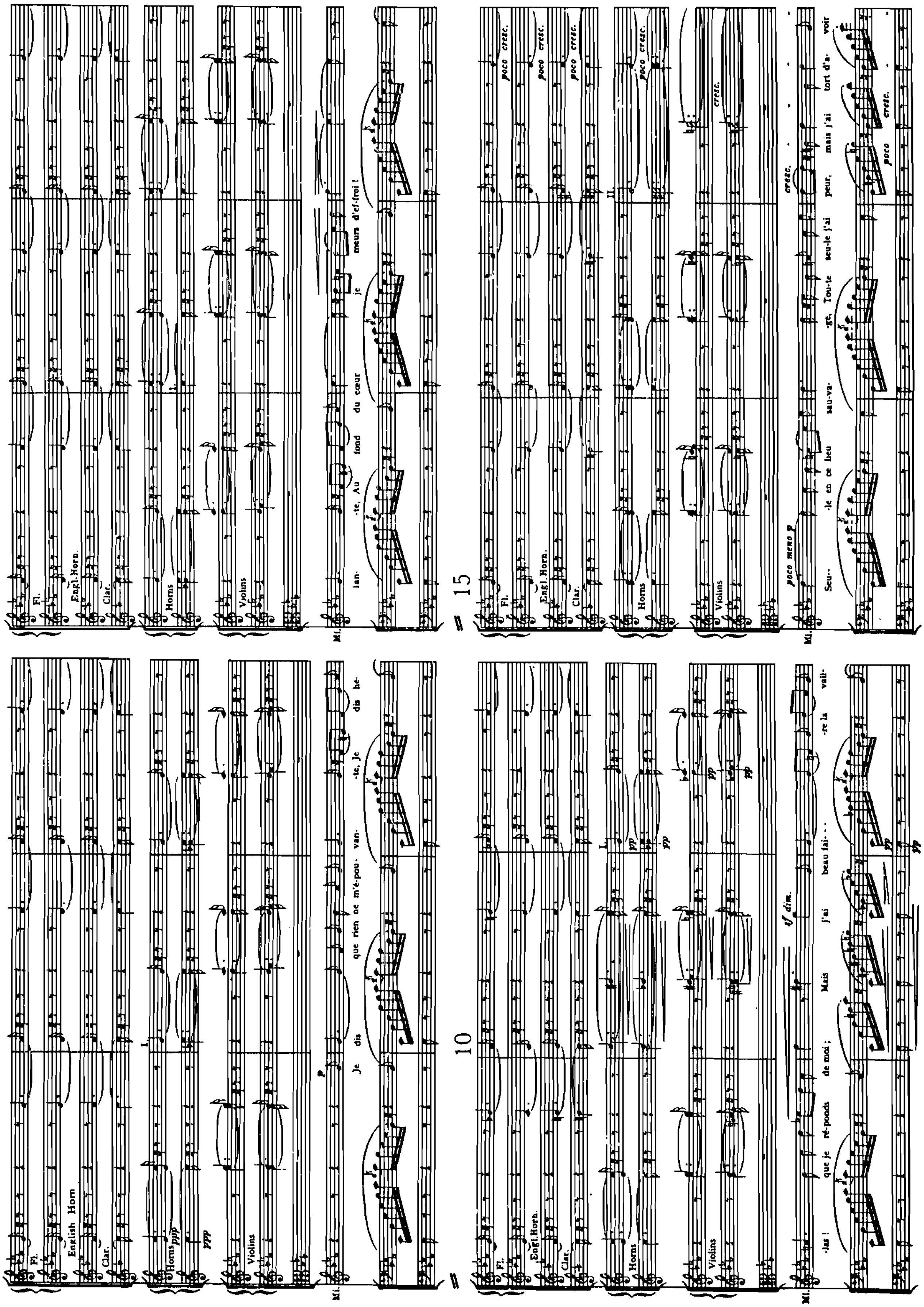


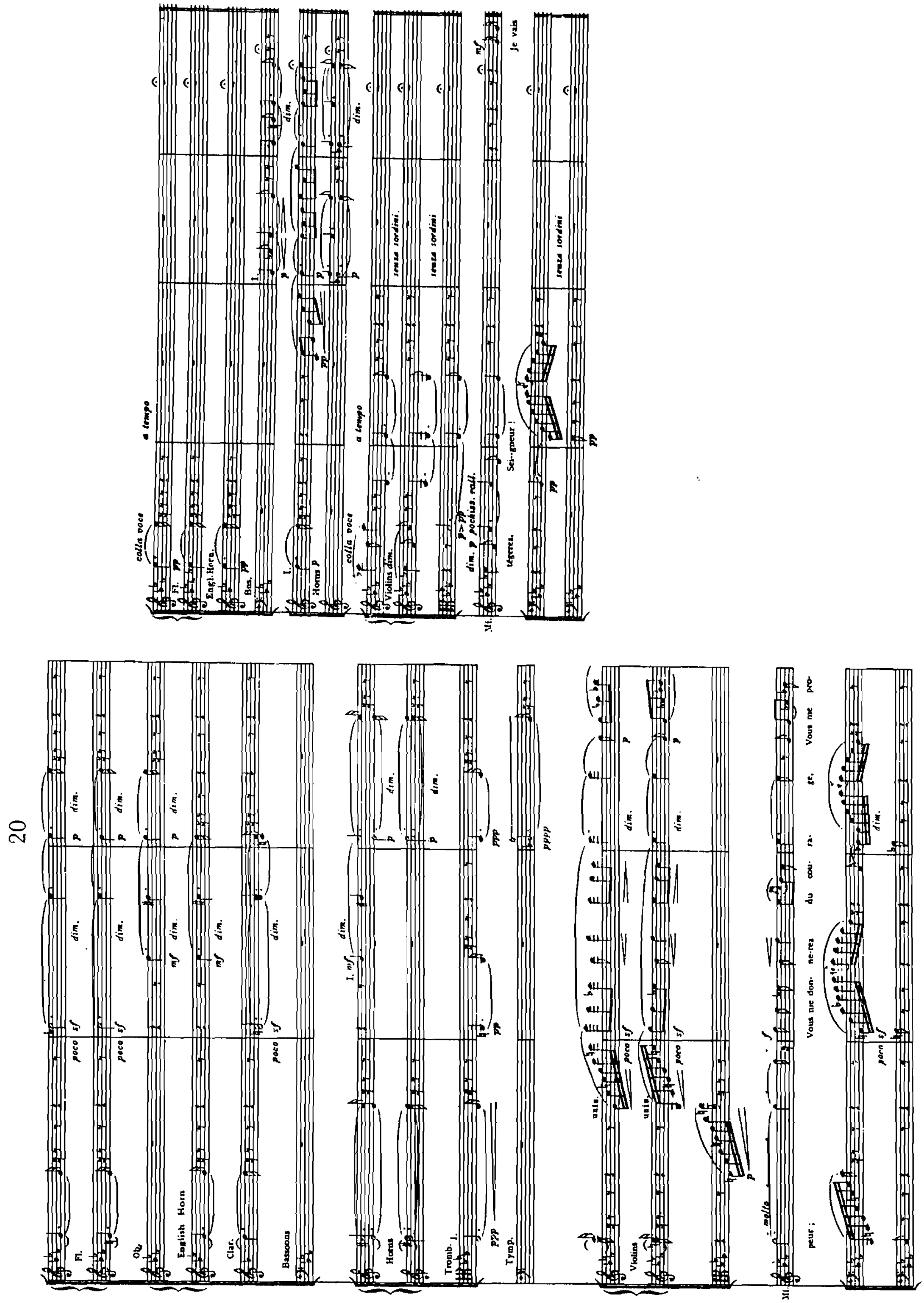


See also Verdi, *La Traviata,* Act III, "Parigi, o cara," mm. 1–35.

The next example is Micaela's aria from the third act of *Carmen.* Notice the wonderful contrast between the high voice and the rather mellow colors used against it. Bizet is very careful to keep the instruments and the voice quite separate rhythmically. Only when the singer reaches her dramatic climax on the word *peur,* does he take the first violins up to double her at a higher octave. The singer is free to make her sad plea with great pathos.

Example XVII–20. Bizet, *Carmen*, Act III, "Je dis que rien ne m'épouvante," mm. 6–24





The next example is not operatic, but is from the orchestral song

Example XVII–21. Mahler, *Lieder eines fahrenden Gesellen*, No. 1, "Wenn mein Schatz," mm. 44–63



literature: a short passage from the first song of the *Lieder eines fahrenden Gesellen* by Mahler. Here the orchestra paints the picture of a meadow with flowers and birds chirping all about. The voice is never obscured in this most colorful setting. It is helped in pitch, yet not doubled throughout. One should study the entire song cycle for some of the most beautiful orchestral accompaniments imaginable.

One should not neglect the study of many other orchestral songs, such as (to name only a few):

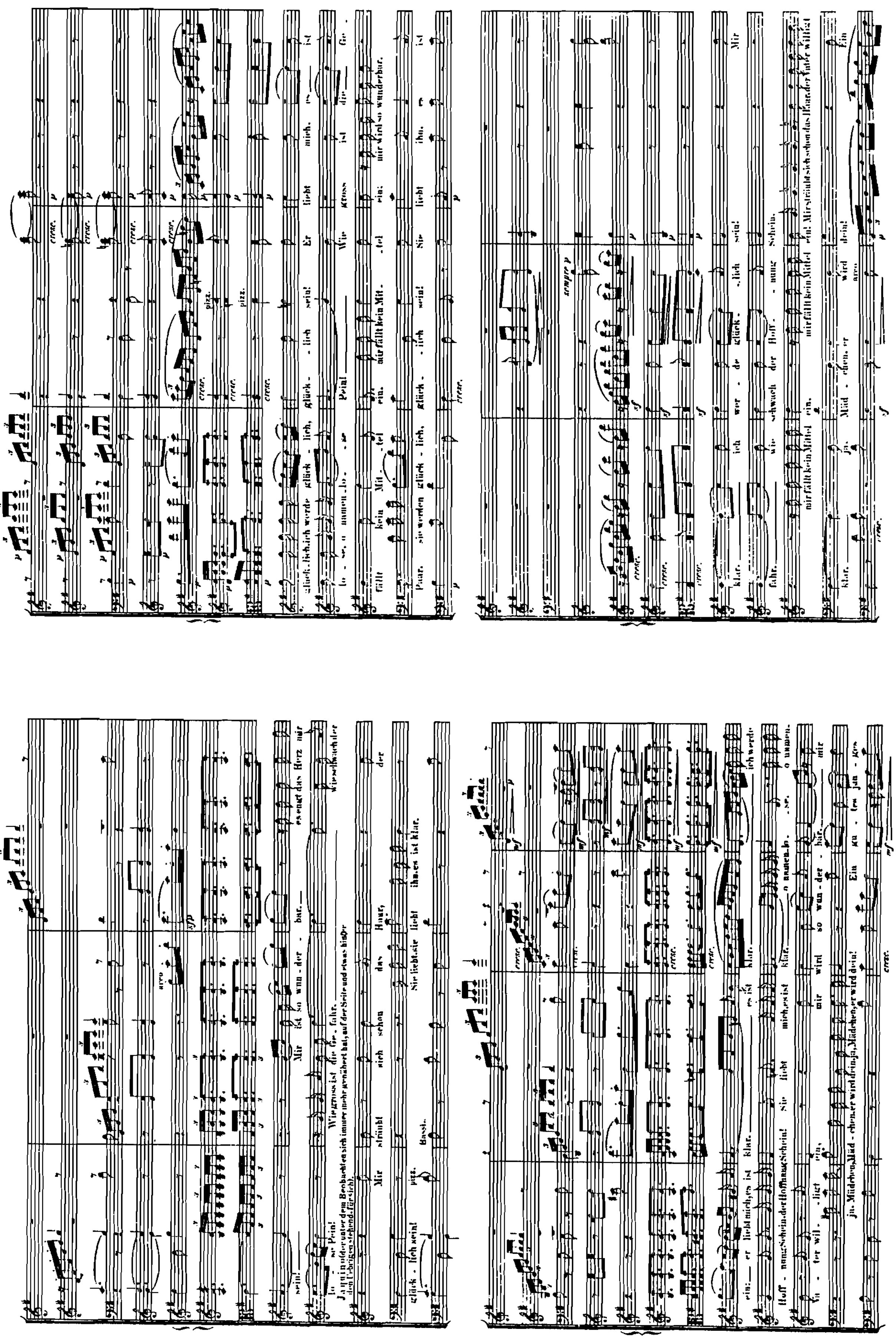
Berlioz, *Nuits d'été*
Mahler, *Kindertotenlieder* and *Das Lied von der Erde*
Ravel, *Shéhérazade*
Barber, *Knoxville: Summer of 1915*
Messiaen, *Poèmes pour Mi*
Britten, *Serenade* and *Nocturne*
Schoenberg, *Erwartung* (solo opera)

We have discussed the solo aria, recitative, and solo orchestral song. It is important that we examine at least one famous ensemble number from the opera stage. The quartet below, a canon from the first act of Beethoven's *Fidelio*, is a brilliant example of wonderful vocal writing, simply and delicately accompanied by the orchestra. Notice that Beethoven doubles the voice parts at all times, either directly or heterophonically, and keeps the texture around the singers extremely light. Study each doubling, for often a bass part is doubled several octaves higher, and conversely, the soprano by a bass instrument. The orchestral figuration adds considerably to the contented spirit that describes at least three of the singers' moods.

Example XVII–22. Beethoven, *Fidelio*, Act I, No. 3





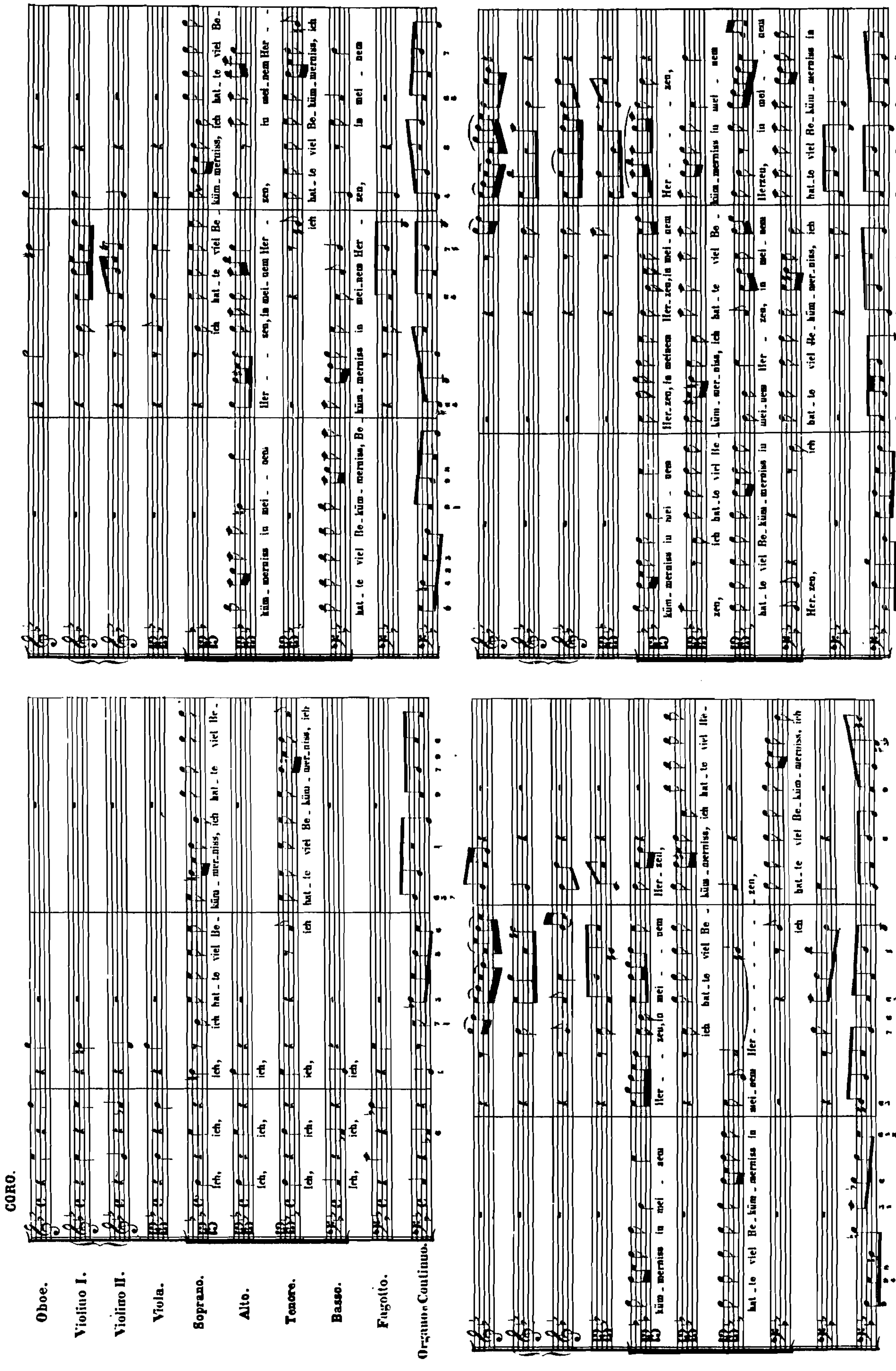




The exciting combination of chorus and orchestra has been a favorite since the time of Monteverdi. As we have already said, one of the most important things to remember is that choral singers are not always professionals and need more pitch support than solo singers. In the Baroque and Classical periods, the chorus, when not doubled, could discern the pitches easily from the clear harmony provided by the orchestra. As the harmonic language grew more complex, composers tried to find a variety of ways to provide good pitch orientation for the choruses:

The following Bach example shows the strong harmony which gives unquestioned support to the contrapuntal choral texture.

Example XVII–23. Bach, *Cantata No. 21*, "Ich hatte viel Bekümmerniss," mm. 1–12



In "The Heavens Are Telling," from *The Creation,* Haydn doubles the entire chorus. It is interesting to notice that in the second phrase, the flute no longer plays the soprano melody, but instead doubles the tenor two octaves higher. Devices like these add great variety to accompaniments.

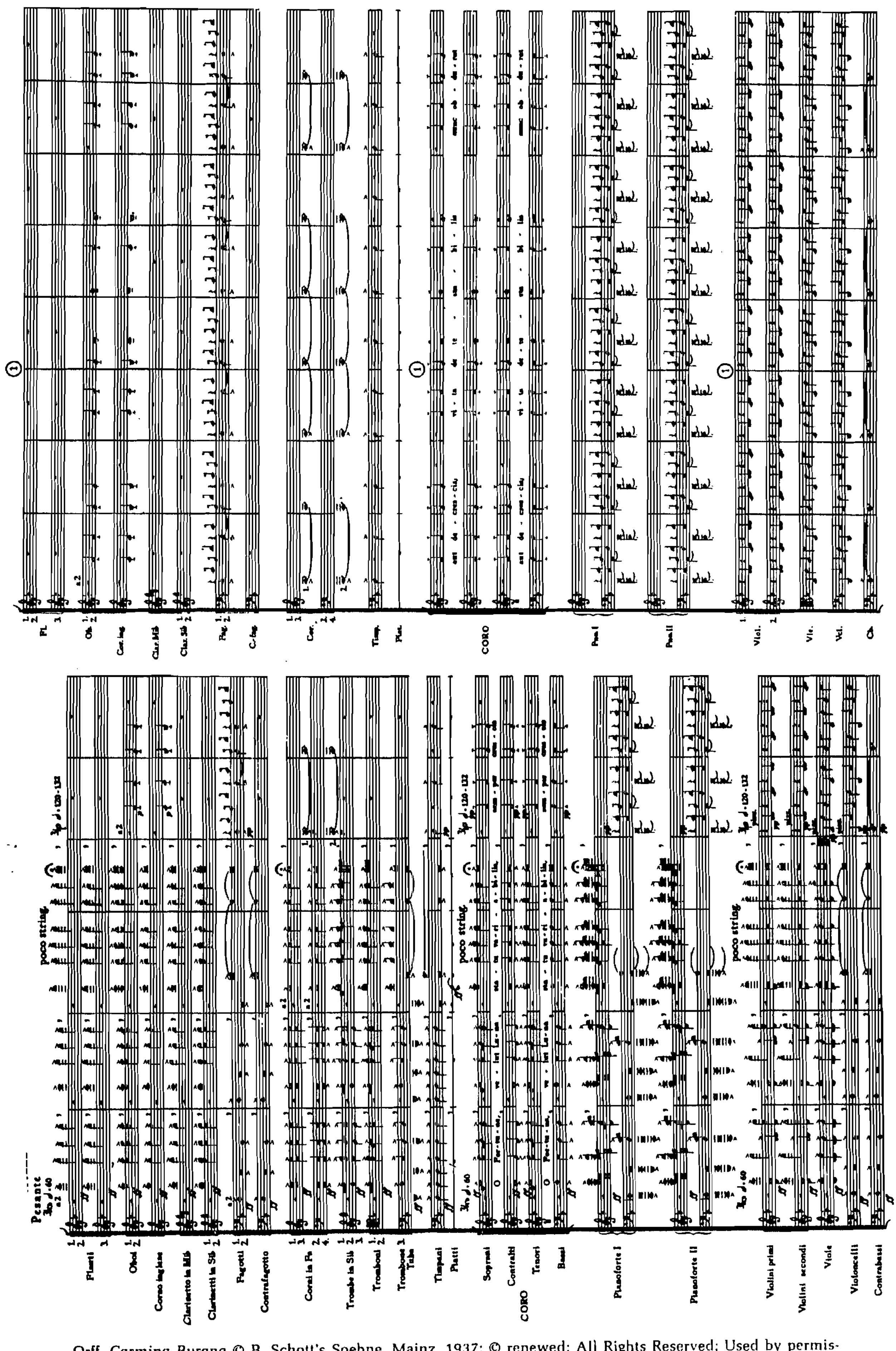
Example XVII–24. Haydn, *The Creation,* No. 13: "The Heavens Are Telling," mm. 1–12



Carmina burana has been a favorite for thirty years now, and even though a large orchestra is employed, Orff always ensures that the chorus sounds through the maze easily. He does so in two ways: 1) by scoring the chorus in its most advantageous range to compete with the "doubling" orchestra; and 2) by setting up an accompaniment figure that does not obscure the chorus while still giving vital pitch and rhythmic assistance. The example on p. 602 certainly bears out these two successful techniques used throughout the work.

It is vital that the student become familiar with the great choral-orchestral literature, not only by listening to the works, but also by studying the scores to learn the successful techniques for accompanying solo and orchestral passages. On p. 603 you will find a short list of recommended works.

Example XVII–25. Orff, *Carmina burana*, "O Fortuna," mm. 1–14



Recommended works for study:

Bach, *B-minor Mass* and *St. Matthew Passion*
Handel, *Messiah* and *Israel in Egypt*
Haydn, *Creation*, *Seasons*, and *Masses*
Mozart, *Requiem* and *C-minor Mass*
Beethoven, *Missa solemnis* and *Mass in C*
Berlioz, *Requiem*
Mendelssohn, *Elijah* and *Hymn of Praise*
Brahms, *German Requiem* and *Alto Rhapsody*
Verdi, *Requiem*
Mahler, *Symphony No. 2*
Kodály, *Psalmus hungaricus*
Debussy, *The Martyrdom of St. Sebastian*
Poulenc, *Gloria*
Honegger, *King David*
Vaughan Williams, *Flos Campos* and *Hodie*
Britten, *War Requiem*
Walton, *Te Deum* and *Belshazzar's Feast*
Stravinsky, *Symphony of Psalms*, *Canticum Sacrum*, *Threni*, and *Oedipus Rex*
Schoenberg, *Gurrelieder*
Bartók, *Cantata profana*
Tippett, *Child of Our Times*
Hindemith, *When Lilacs Last in the Dooryard Bloomed*
Prokofiev, *Alexander Nevsky*
Sessions, *When Lilacs Last in the Dooryard Bloomed*
Berio, *Sinfonia*

This is only a small sample of the works readily available on recordings. There are, of course, many more, especially chorus and orchestra combinations from such operas as *Fidelio*, *Der Freischütz*, *Carmen*, *Otello*, *Turandot*, and in particular, *Boris Goudonov* and *Wozzeck*.

18

The Preparation of Score and Parts

From a wry paraphrase of a benevolent adage, we learn that "To err is human; to forgive is not our policy." This sentiment is particularly apposite in relation to the preparation of scores and parts. While conductors and orchestral performers may occasionally make mistakes, these very human humans usually do not forgive the errors of the orchestrator, the copyist, or the composer. Rehearsals can degenerate into traumatic grumbling sessions when frequent errors in the score or parts interfere with the smooth performance of a work. In fact, many pieces have been denied a hearing because of just such situations. It is most appropriate, therefore, that we take this final chapter to discuss and to review the correct procedures for laying out a score and extracting parts in the most professional manner.

Here are the considerations which must govern that process:

1. The score must be clear, easy to read, and as unproblematical as possible. The last phrase means that all new, different, or original notation must be carefully explained, so that when a conductor reads the score it will be self-evident.

2. The score must be organized logically, with every instrument appropriately labeled: the vertical alignment of the music must be accurate so that all notes and beats coincide. The spacing on the page, indicating the separation of choirs, must be immediately discernable, for a conductor has to read all the lines simultaneously.

3. In addition to rehearsal numbers, the score must contain every detail for every instrument, including special instructions concerning bowing, tonguing, or articulations.

THE ORCHESTRAL SCORE SETUP

The instruments of a large symphony orchestra appear on a full score page in an unvarying order:

Piccolo
Flutes I and II
Oboes I and II
English Horn
Clarinet (in D or E♭), indicated at the beginning of the score
Clarinet I and II (in B♭ or A), indicated at the beginning of the score
Bass Clarinet
Bassoons I and II
Contrabassoon

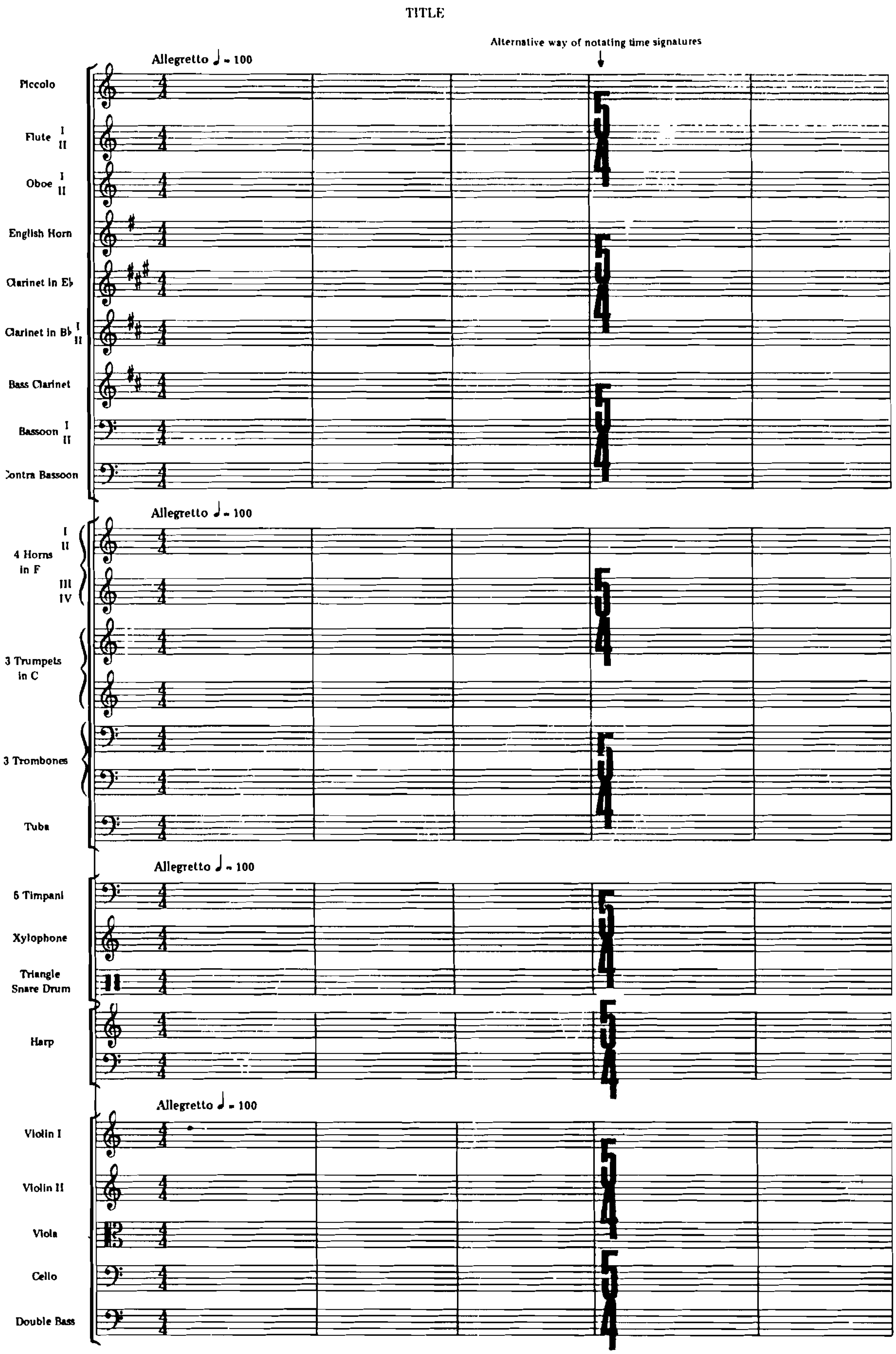
Horns I, II, III, IV—Keys of the horns must be given at the beginning of the score.
Trumpets I, II, III—Keys of the trumpets must be given at the beginning of the score.
Trombones I, II, III
Tuba
Timpani—The number of drums should be given at the beginning of the score.
Percussion—All instruments must be listed at the beginning of the score.
Harp
Piano (Celesta)
Strings

If there are additional instruments, these should be fitted into their family, such as Wagner's tubas or euphonium between the trombones and the tuba, or saxophones between the bass clarinet and the bassoons. (N.B.: In some American scores the saxophones are printed below the bassoons or even below the brass, just above the timpani.)

It is imperative to leave space between the choirs on the score page. Leave an empty line between the winds and the brass, between the brass and the percussion, between the percussion and the harp, between the (harp) piano and the strings.

If there is an independent piccolo part in the composition it appears above the flute parts. If the second or third flutes double on piccolo, the piccolo part will appear on the line normally read by that player. The alto flute part is always placed below the regular flute parts, and most often is doubled by the third flute.

Example XVIII–1



This principle of alternation equally applies to a second or third oboist doubling on English horn, a clarinetist doubling on bass clarinet, or a bassoonist doubling on contrabassoon. To indicate that the player is to change instruments, the instruction "change to ______," or in Italian, "muta in ______," should be given well ahead of time and should be written above the player's staff. Further, if a change of key signature or clef is required because of a transposition change in the new instrument, this also appears at the point of instruction.

From time to time, the horns are grouped I–III and II–IV on two staffs, when there is an excess of unisons for the high and low horns; most often, Horns I and II share one staff, III and IV the other.

Trumpets and trombones are written on two staffs respectively. In both cases, Instrument I is separated from Instruments II and III, which share the second staff of their sections.

The score layout on page 523 is for the entire orchestra. Notice that all staffs are connected with a single barline at the beginning of the line; heavy brackets set off the choirs; and an additional brace clarifies instruments of a family. Measure lines should be drawn only through the individual complete choirs. It is absolutely wrong to rule a measure line through an entire score, for it obscures the choirs and is a deterrent to rapid reading by the conductor.

Key signatures should appear in their traditional position right after the clef signs, followed by the time signature. These time signatures may be repeated on every instrumental line or enlarged to one time signature for each choir. It is strongly urged that tempo markings be placed at the top of the score and repeated in the space separating each choir. Dynamics are usually placed below the staff, unless two instruments share a staff and two different sets of dynamics are required.

Up to this point, we have dealt only with the initial page of a score. However, the subsequent pages should follow the same model, except that one may use abbreviations for the instrument names. Unless there is a change from one transposing instrument to another, such as Clarinet in B♭ switching to Clarinet in A in the middle of a work, it is not necessary to repeat the transposition on every page. Some composers try to use all kinds of short cuts, like leaving out clefs or key signatures after the initial page; this custom should be strongly discouraged, even if it is used extensively in jazz charts. On the other hand, the cutout score originated by Stravinsky, and very popular through the '60s and early '70s, is quite valid. In this kind of score, the staffs begin where the particular instrument starts to play, and stop as soon as that instrument ceases to play. Notice in the following example that each instrument is always placed in the correct choir and is labeled every time it enters.

Example XVIII–2. Stravinsky, *Movements for Piano and Orchestra*, mm. 13–39: Cutout Score



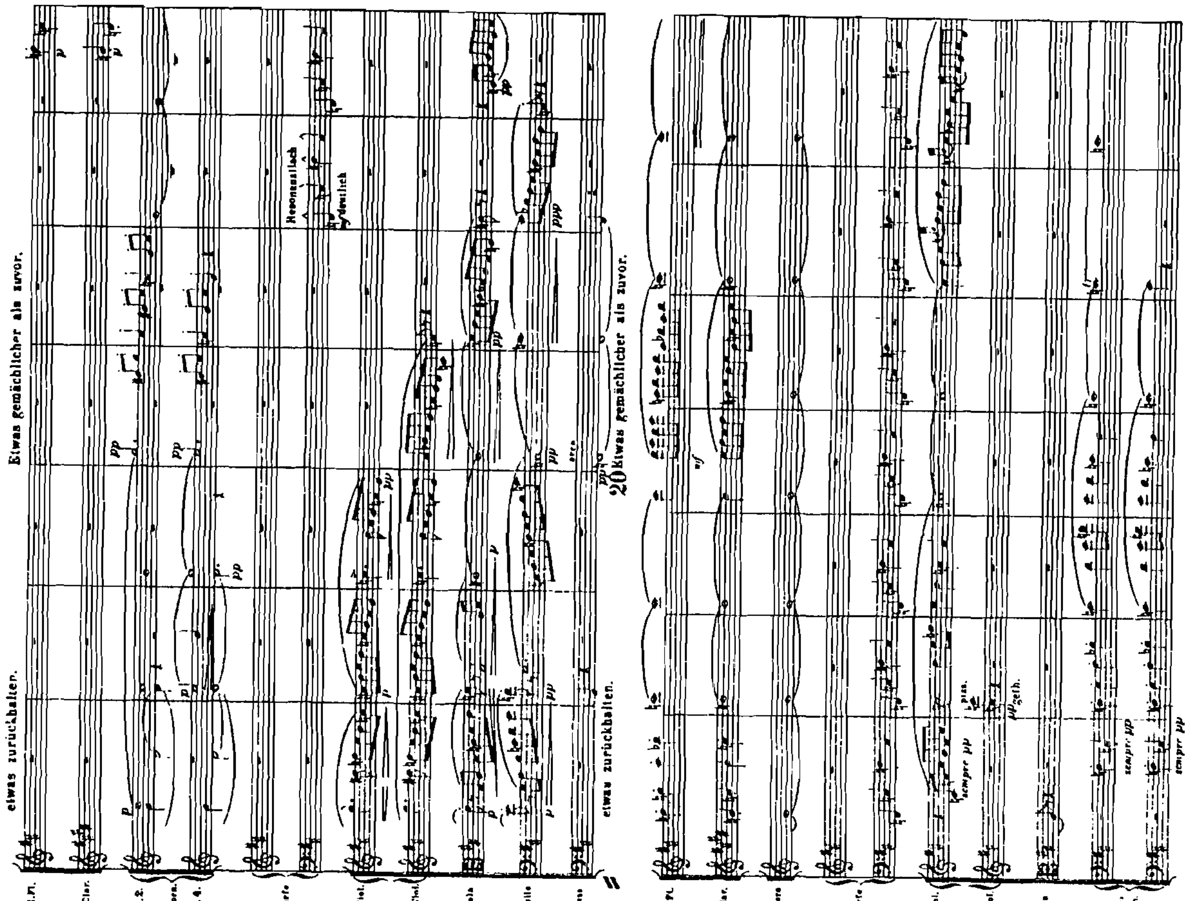
THE REDUCED SCORE

After the initial page, subsequent pages may contain more than one system because only a few instruments are playing at a time. Pages like this are called *reduced scores*. Make certain that two heavy slash marks appear between the systems so that it will be easy for the eye to separate them immediately. Also, it is imperative that all the instruments must be clearly marked in all systems appearing on a page, and that the order of choirs remains the same as on the initial page of the score. (See Example XVIII–3 on facing page.)

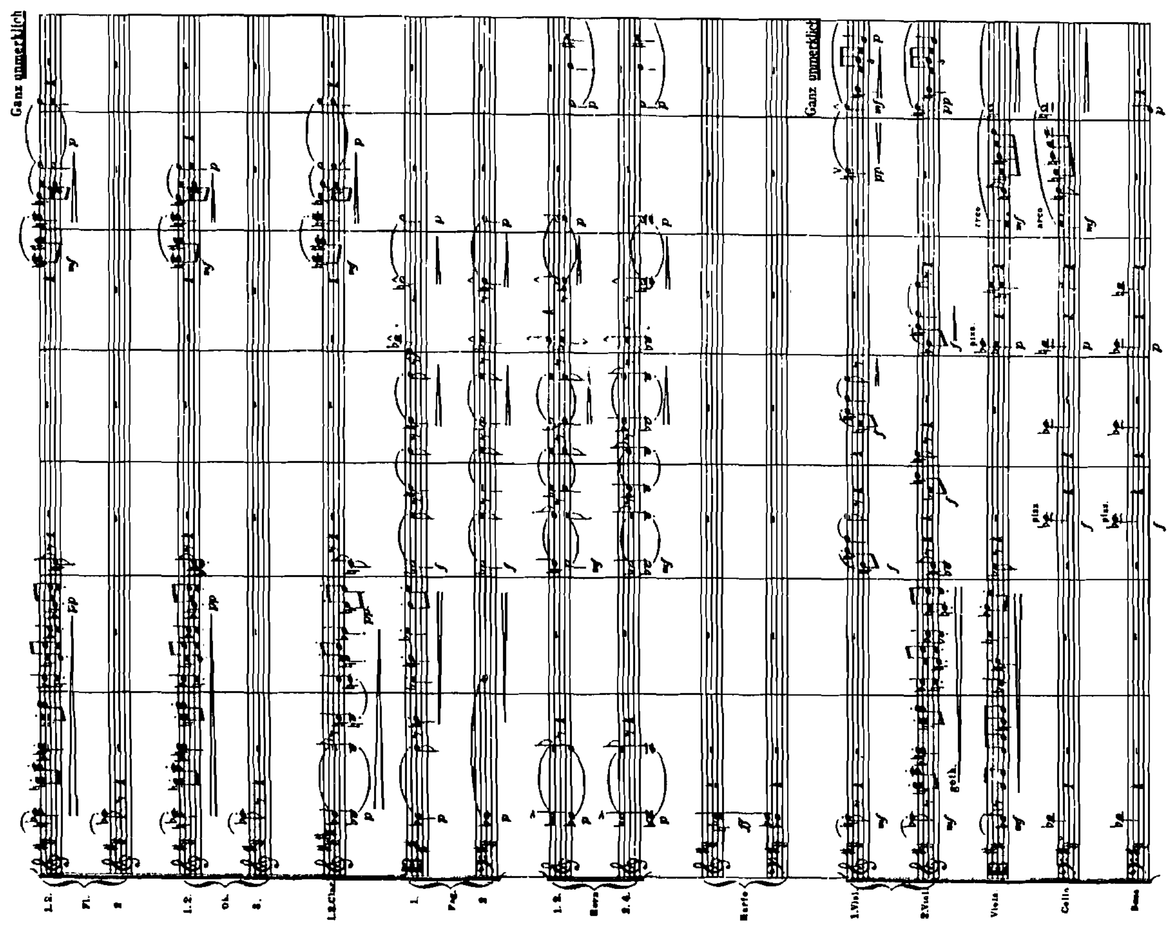
THE CONDENSED SCORE

When writing educational or commercial music, the composer is often asked to supply a *condensed score*, in which a full score is reduced to only three or four staffs, but all the essential pitches

Example XVIII–3. Mahler, *Symphony No. 1*, first movement



b. Reduced-score page, mm. 276–89



a. Full-score page, mm. 269–75

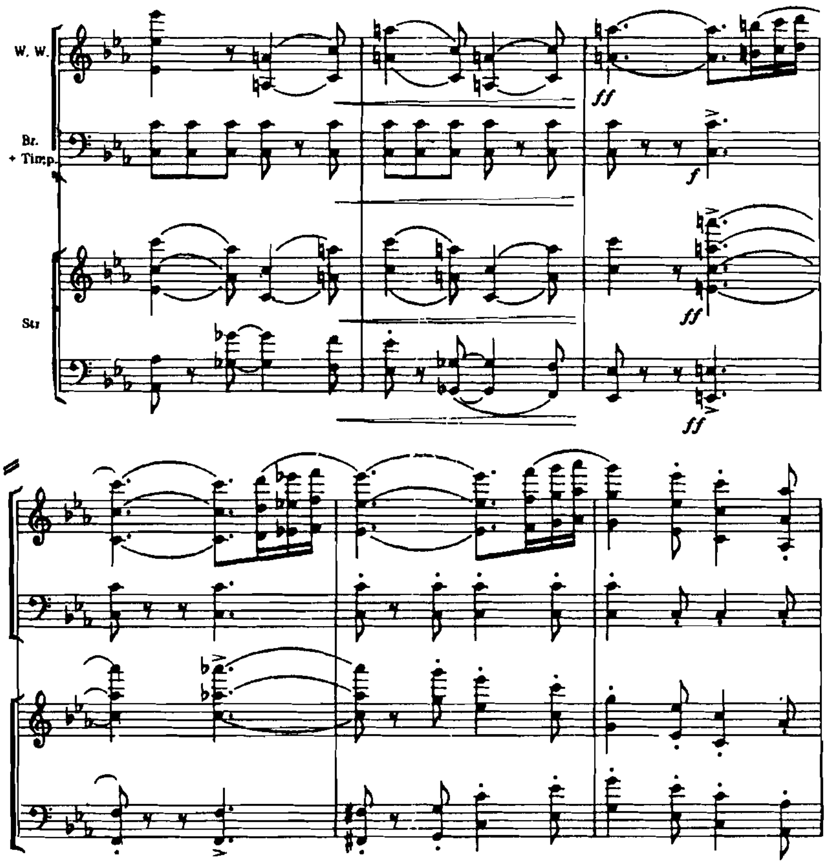
(melodic), rhythms and harmonics contained in the full score are provided. This reduction should all be in C with no transpositions. It may or may not be playable on the piano. If it is to be a *piano reduction*, it should be written on two staffs, omitting all nonessential octave doublings so that it can be played with ten fingers. A regular three- or four-line condensed score most often uses a line for each choir and is prepared for conductors who are not able to read a full score fluently. Here is an example of a condensed score and a piano version of the same passage.

Example XVIII–4. Brahms, *Symphony No. 1*, first movement, mm. 82–87.

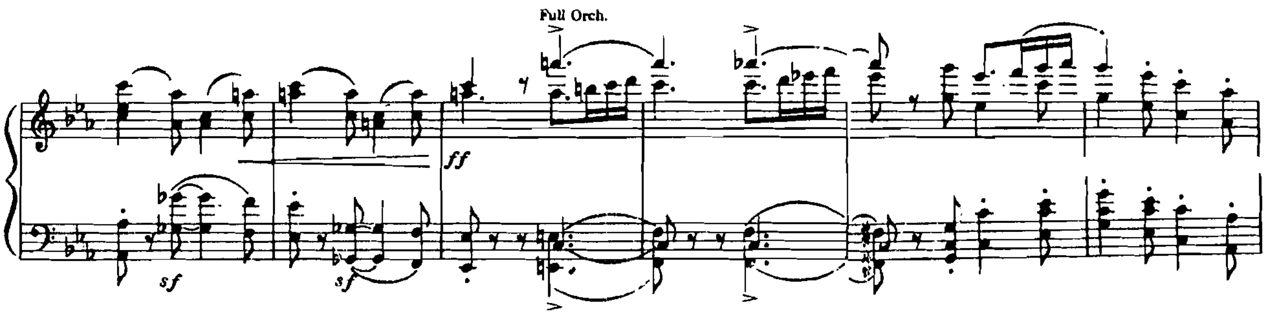
a. Full Score



b. Condensed Score



c. Piano Score



PREPARING INDIVIDUAL PARTS

The clearer the parts, the easier it is to perform a work. This statement is especially valid today, for orchestral music has become more and more difficult. It is essential that all notation, other than the standard, universally accepted symbols, be carefully explained in a "Guide to the Notation" at the beginning of the individual part. If the work contains no unusual notation, this is not necessary.

Here are some important suggestions to follow in extracting parts from a score:

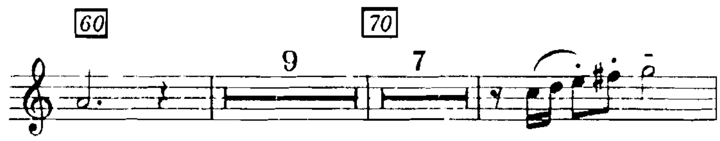
1. Use a good size (9½″ x 12½″) paper with no more than twelve staffs on each page, and provide each player with his own part. Strings, of course, should have one part per stand.

2. Use ink rather than pencil. The diazo process, in which the score and parts are prepared on transparencies, is highly recommended over other duplicating processes for professional clarity.

3. Make the noteheads at least as large as those printed in a published part for easy visibility. The same holds true for the flags on eighth or sixteenth notes, the rests, and the thickness of beams denoting rhythmic divisions.

4. Be sure to include rehearsal numbers or letters in both score and parts. Chaos may result if a rehearsal number or a change of meter is omitted because it occurs while an instrument is resting. Make certain that every player has detailed information about what is happening every moment in the performance, whether he is playing or not. Let us suppose a player has sixteen measures' rest, and the score has rehearsal numbers placed every ten measures. Here is the way his part should read:

Example XVIII–5



The same rule would apply if changes of meter occurred within that rest period. Let us suppose that measure 65 is in 3/4, and the rest of the measures are 4/4. This is how the part should read with the added detail:

Example XVIII–6



5. It is imperative that a woodwind or brass player has enough time at the end of a page to make the turn. In string orchestral parts, the person on the inside of the stand turns the page, while the partner on the outside continues to play so that a rest is not essential. The general problem of page turning must be dealt with when you begin to lay out a part on a page. Wind or brass players have been known to leave out an entire passage because there were no rests to free their hands. And even in string parts, you must consider the weakening effect on an important string passage when half the section drops out to turn a page.

6. Cues are often necessary to facilitate re-entry after a long period of rest. Both the instrument playing that particular cue and the place where the cue begins should be clearly indicated. The notes in the cued parts should be smaller than those in the rest of the part. Also, the cue should be transposed to fit the part into which it is written.

Example XVIII–7



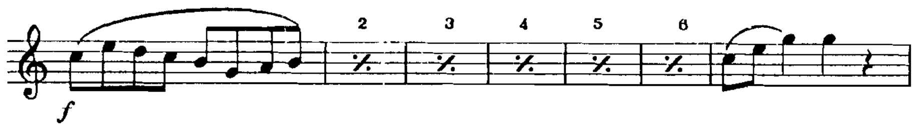
7. Quite frequently, parts for oboes, bassoons, violas, or even horns are cross-cued in other parts so that important lines assigned to these instruments will not be lost. Particularly in music for school orchestra, cross-cuing is often advisable. Since violas are scarce in many of our high school orchestras, it may be necessary to supply a third violin and a second cello part which divide up the viola part. These should be used only if no violas are available. However, important oboe lines and English horn parts are often cross-cued in the clarinet, violin, or muted trumpet parts, depending on where they lie in the register. Bassoons are cross-cued in the clarinet or cello parts, and sometimes a tenor saxophone part is supplied if no bassoon is available. As mentioned in the chapter on transcriptions, there is no real substitute for the original instrument. However the best possible solution has to be found to prevent the loss of important lines, even if the cross-cued instrument's sound is a bit removed from the composer's original intention. Be certain that all cross-cuing is indicated in the full score so that the conductor may assign each substitution.

8. Some shortcuts that are permissible when copying out parts:

a. One should use 8va, 15ma, or 8^{basso} designations as much as possible to avoid more than four ledger lines above or below the staff.

b. When a passage is repeated exactly, repeat marks may be used. It is helpful to number the repeated measures for easier execution:

Example XVIII–8



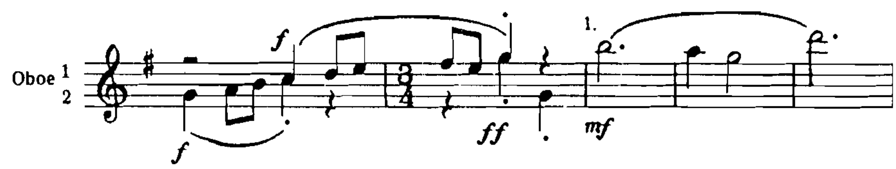
c. The abbreviations *sim.*, *sempre stacc.*, *sempre legato*, etc. are also permissible to avoid repeating details like staccatos, slurs, etc.

Example XVIII–9

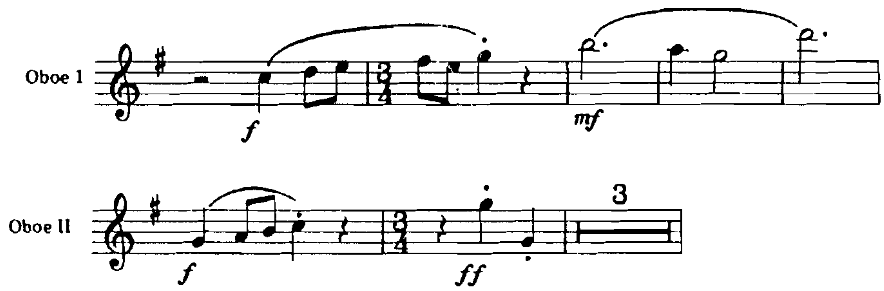


9. When two instruments are written on the same staff in the score, they should have separate parts for each player.

Example XVIII–10a. Score



b. Parts



Last but not least, we must mention proofreading. As a general rule, proofreading your own score and parts is a difficult chore. Therefore, it is urged that a two-step process be followed to insure a minimum of errors.

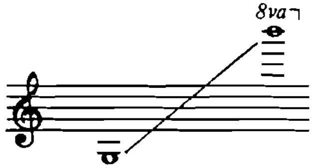
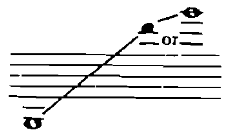
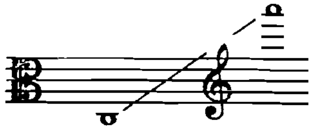
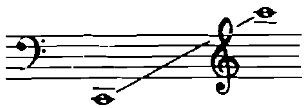
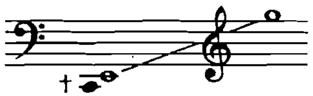
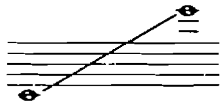
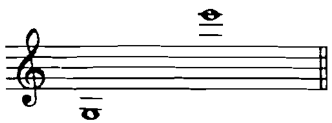
1. Proofread both score and parts thoroughly yourself.
2. Let someone else proof them so as to make certain you have not overlooked even the smallest detail. This can make the difference between a flawless first reading (and first impression) and a tedious rehearsal, which is discouraging to both composer and performers.

For a more detailed study of manuscript preparation, the student is referred to George Heussenstamm's very useful handbook, *The Norton Manual of Music Notation* (New York: W.W. Norton, 1987). Other books on this subject include:

Boehm, L. *Modern Music Notation*. New York: G. Schirmer, 1961.
Donato, A. *Preparing Music Manuscript*. Englewood Cliffs, New Jersey: Prentice-Hall, 1963.
Read, G. *Music Notation*. Boston: Allyn and Bacon, 1964.
Read, G. *Modern Rhythmic Notation*. Bloomington: Indiana University Press, 1978.
Risatti, Howard. *New Music Vocabulary*. Urbana: University of Illinois Press, 1975.
Stone, K. *Music Notation in the Twentieth Century*. New York: W. W. Norton, 1980.
Warfield, G. *How to Write Music Manuscript*. New York: Longman, 1977.

Appendix A

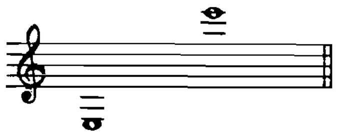
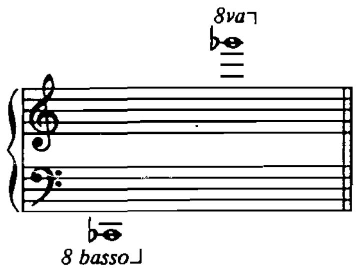
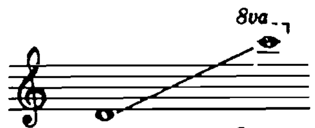
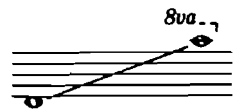
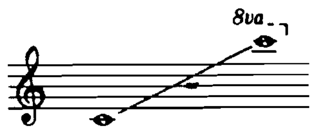
1. QUICK REFERENCE TO RANGES OF MOST FREQUENTLY-USED ORCHESTRAL INSTRUMENTS

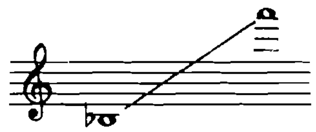
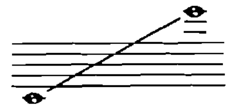
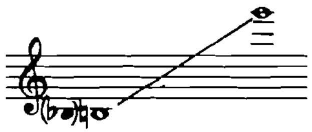
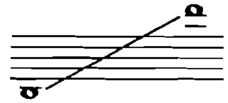
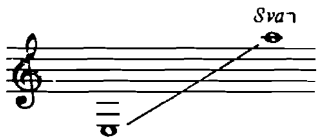
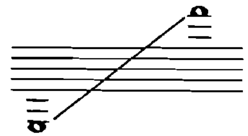
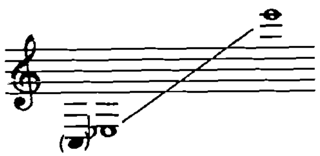
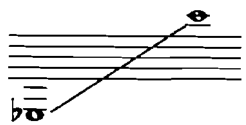
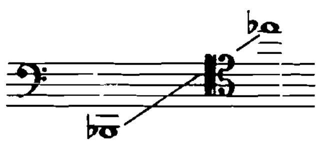
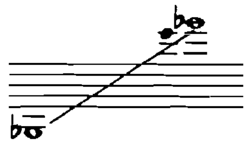
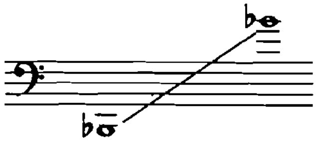
Instrument	*Written Range (Professional)* *	*Sounding*	*Written Range (Nonprofessional)* **	*Comments*
Strings				
Violin		as written		
Viola		as written		
Cello		as written		
Double Bass		octave lower		
Mandolin		as written		

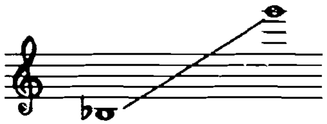
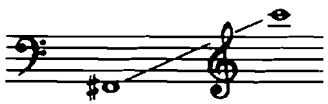
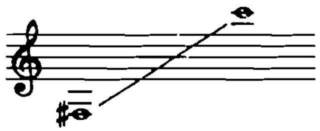
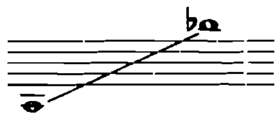
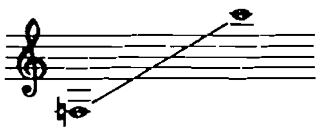
*The uppermost notes for professional players are "limitless" on many instruments. The ones given here are those usually called for in orchestral playing.

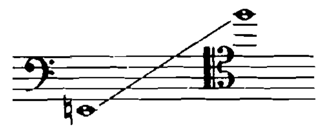
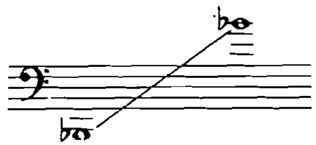
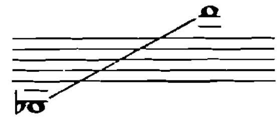
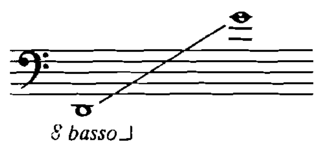
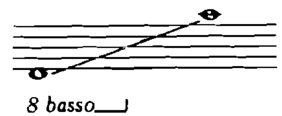
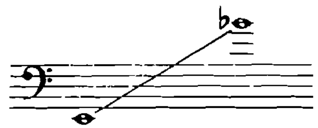
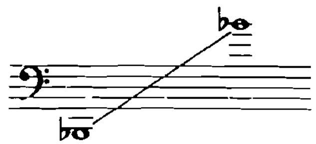
**The filled-in middle-range notes are for beginning orchestras; the others are for amateur groups.

†Not found on every instrument.

Instrument	*Written Range (Professional)*	*Sounding*	*Written Range (Nonprofessional)*	*Comments*
Banjo		as written, but Tenor Banjo sounds octave lower		
Guitar		octave lower		
Harp (with pedals up)		as written		
Woodwinds				
Piccolo		octave higher		
Flute		as written		
Alto Flute		perfect 4th lower		Usually not available in amateur groups

Oboe		as written		
English Horn		perfect 5th lower		Very seldom available in amateur or school orchestras
All Clarinets except Bass		B♭: major 2nd lower A: minor 3rd lower D: major 2nd higher E♭: minor 3rd higher		Usually no D or E♭ clarinets in nonprofessional orchestras
Bass Clarinet		major 9th lower; if written in bass clef, major 2nd lower		Usually unavailable in amateur or school groups
Bassoon		as written		Watch lowest and highest notes for amateurs
Contrabassoon		octave lower		Usually not available in nonprofessional groups

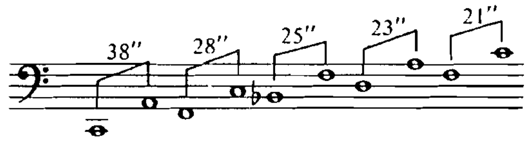
Instrument	*Written Range (Professional)*	*Sounding*	*Written Range (Nonprofessional)*	*Comments*
All saxophones		B♭ Soprano: major 2nd lower E♭ Alto: major 6th lower B♭ Tenor: major 9th lower E♭ Baritone: octave and major 6th lower B♭ Bass: 2 octaves and a major 2nd lower		If available in amateur groups, the saxophones should not be scored very low or very high
Brass				
Horn (plus pedal notes)		perfect 5th lower		
All Trumpets except E♭ Bass		C: as written B♭: major 2nd lower D: major 2nd higher E♭: minor 3rd higher Cornet in B♭: major 2nd lower Bass in C: octave lower Bass in B♭: major 9th lower Flugelhorn: major 2nd lower		Use only B♭ and C trumpets
Bass Trumpet in E♭		major 6th lower		

Tenor Trombone		as written		
Bass Trombone		as written		
Tuba		as written		
Baritone		as written; if notated in treble clef, major 9th lower		
Euphonium		as written; if notated in treble clef, major 9th lower		Rarely available in amateur orchestras, but always found in bands

Instrument	*Written Range (Professional)*	*Sounding*

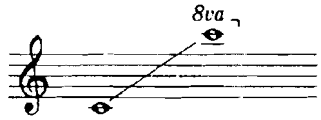
Percussion

Timpani



as written

Xylophone



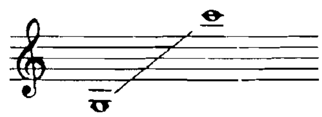
octave higher

Marimba



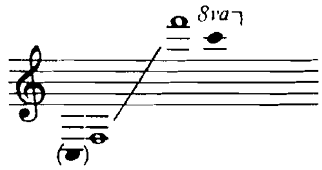
as written

Glockenspiel



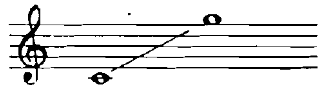
2 octaves higher

Vibraphone



as written

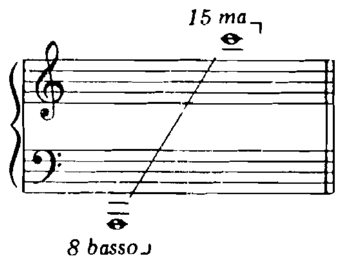
Chimes



as written

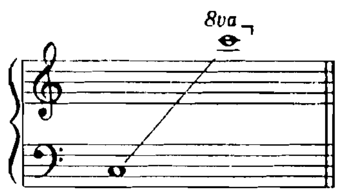
Keyboard

Piano



as written

Celesta



octave higher

Harpsichord



as written

Harmonium



as written

Organ



as written

2. NAMES OF INSTRUMENTS IN FOUR LANGUAGES AND THEIR ENGLISH ABBREVIATIONS

English	*Italian*	*French*	*German*
Strings:	*Archi:*	*Cordes:*	*Streichinstrumente:*
Violin (vl.)	Violino	Violon	Violine or Geige
Viola (vla.)	Viola	Alto	Bratsche
Violoncello (vlc.)	Violoncello	Violoncelle	Violoncell
Double Bass (d.b.)	Contrabasso	Contrebasse	Kontrabass
Harp	Arpa	Harpe	Harfe
Woodwinds:	*Legni* (or *Fiati*):	*Bois:*	*Holzbläser:*
Piccolo (picc.)	Ottavino or Flauto Piccolo	Petite Flûte	Kleine Flöte or Pickelflöte
Flute (fl.)	Flauto	Flûte	Flöte
Oboe (ob.)	Oboe	Hautbois	Oboe or Hoboe
English Horn (Eng. hn.)	Corno Inglese	Cor Anglais	Englisches Horn
Clarinet (cl.)	Clarinetto	Clarinette	Klarinette
Bass Clarinet (b. cl.)	Clarone	Clarinette Basse	Bassklarinette
Bassoon (bn.)	Fagotto	Basson	Fagott
Contrabassoon (cbn)	Contrafagotto	Contrebasson	Kontrafagott
Saxophone (sax).	Sassofone	Saxophone	Saxophon
Brass(es):	*Ottoni:*	*Cuivres:*	*Blechinstrumente:*
Horn (hn.)	Corno	Cor	Horn
Trumpet (tr. *or* tpt.)	Tromba	Trompette	Trompete
Trombone (trb. *or* tbn.)	Trombone	Trombone	Posaune
Tuba (t.)	Tuba	Tuba	Tuba
Percussion	*Percussione*	*Batterie*	*Schlagzeug*
	IDIOPHONES OF DEFINITE PITCH		
Marimba (mar.)	Marimba	Marimba	Marimbaphon
Xylophone (xyl.)	Xilofono or Silofono	Xylophone or Claquebois	Xylophon or Holzharmonika

English	*Italian*	*French*	*German*
METAL INSTRUMENTS OF DEFINITE PITCH			
Orchestral Bells (Glsp.)	Campanelli *or* Campanette	Jeu de Timbres or Carillon	Glockenspiel *or* Stahlspiel
Vibraphone (vib.)	Vibrafono	Vibraphone	Vibraphon
Tubular Chimes (chm.)	Campane *or* Campane Tubolari	Jeu des Cloches	Röhrenglocken *or* Glocken
Celesta (cel.)	Celesta *or* Celeste	Céleste	Celesta
Gong (gong)	Gong	Gong	Gong
Crotales (crot.)	Crotali	Crotales or Cymbales Antiques	Zimbeln
Anvil (anv.)	Incudine	Enclume	Amboss
Musical Saw (saw)	Sega Cantante	Lame Musicale	Singende Säge
Flexatone (flex.)	Flessatono	Flexatone	Flexaton
MEMBRANOPHONES OF DEFINITE PITCH			
Timpani (timp.)	Timpani	Timbales	Pauken
Roto-Tom (r. tom)	Roto-Tom-Tom	Roto-Tom	Tom-Tom-Spiel
MEMBRANOPHONES OF INDEFINITE PITCH			
Snare Drum (s. dr.)	Tamburo Piccolo	Caisse Claire *or* Tambour	Kleine Trommel
(with snares on)	(Colle Corde)	(avec timbres)	(mit Schnarrsaite)
(with snares off)	(senza le corde)	(sans timbres)	(ohne Schnarrsaite)
Tenor Drum (t. dr.)	Tamburo Militare	Tambour Militaire	Wirbeltrommel *or* Rührtrommel

Tom-Tom (t.t.)	Tom-Tom	Tom-Tom	Tom-Tom
Bongos (bong.)	Bongos *or* Bonghi	Bongos	Bongos
Timbales (timb.)	Timpanetti	Timbales Cubaines	Kuba-Pauken
Conga Drum (conga)	Tumba	Conga	Conga-Trommel *or* Tumba
Bass Drum (b. dr.)	Gran Cassa *or* Gran Tamburo	Grosse Caisse	Grosse Trommel
(upright)	(verticale)	(verticale)	(aufrecht)
(on side)	(orizzontale)	(à plat)	(liegend)
Tambourine (tamb.)	Tamburo basco *or* Tamburino	Tambour de Basque	Tamburin *or* Schellentrommel

WOODEN INSTRUMENTS OF INDEFINITE PITCH

Woodblock (w. bl.)	Blocco de Legno	Bloc de Bois	Holzblock
Temple Block (t. bl.)	Blocco de Legno Cinese	Temple-Bloc	Tempelblock
Claves (claves)	Claves	Claves	Claves *or* Holzstab
Castanets (cast.)	Castagnette *or* Nacchere	Castagnettes	Kastagnetten

METAL INSTRUMENTS OF INDEFINITE PITCH

Finger Cymbals (fing. cymb.)	Cimbalini	Cymbales Digitales	Fingerzimbeln
Crash Cymbals (cymb.)	Piatti *or* Cinelli	Cymbales	Becken *or* Tellern
Suspended Cymbal (susp. cymb.)	Piatto Sospeso	Cymbale Suspendue	Hängendes Becken
Sizzle cymbal (sizz. cymb.)	Piatto Chiodat	Cymbale sur Tiges	Nietenbecken

English	*Italian*	*French*	*German*
	METAL INSTRUMENTS OF DEFINITE PITCH (*cont.*)		
Triangle (trgl.)	Triangolo *or* Acciarino	Triangle	Triangel
Cowbells (cowb.)	Cencerro	Sonnailles *or* Cloches à Vache	Kuhglocken *or* Kuhschellen
Tam-Tam (t.t.)	Tamtam	Tam-Tam	Tamtam
	OTHER SOUND SOURCES OF INDEFINITE PITCH		
Whip *or* Slapstick (slapst.)	Frusta	Fouet	Peitsche
Ratchet (ratch.)	Raganella	Crécelle	Ratsche
Sandpaper Blocks (sandp. bl.)	Carta Vetrata	Papier de Verre	Sandpapier *or* Sandblöcke
Wooden Wind Chimes	Bacchette di Legno Sospese	Baguettes de Bois Suspendues	Holz-Windglocken
Bamboo Wind Chimes	Tubi di Bambù	Bambou Suspendu	Bambusrohre
Metal Wind Chimes	Bacchette di Metallo Sospese	Baguettes Metalliques Suspendues	Metall-Windglocken
Glass Wind Chimes	Bacchette di Vetro Sospese	Baguettes de Verre Suspendues	Glas-Windglocken

3. SOME FREQUENTLY-USED ORCHESTRAL TERMS IN FOUR LANGUAGES

English	*Italian*	*French*	*German*
Muted	Con Sordino Con sordini	Sourdine(s)	mit Dämpfer (or Gedämpft, in horns)
Take Off Mutes	Via Sordini	Enlevez les Sourdines	Dämpfer(n) Weg
Without Mute	Senza Sordino	Sans Sourdine	Ohne Dämpfer
Divided	Divisi (div.)	Divisé(e)s (div.)	Geteilt (get.)
Divided in 3 Parts	div. a 3	div. à 3	Dreifach
Divided in 4 Parts	div. a 4	div. à 4	Vierfach
In Unison	Unisono (unis.)	Unis	Zusammen
Solo	Solo	Seul	Allein
All	Tutti	Tous	Alle
1. (first only), 2.	1°, 2°	1er, 2e	1ste (or einfach), 2te
a 2	a 2	à 2	zu 2
At (near) the Bridge	Sul Ponticello	Sur le Chevalet	am Steg
Over the Fingerboard	Sul Tasto (or Sulla Tastiera)	Sur la Touche	am Griffbrett
With the Wood of the Bow	Col Legno	Avec le Bois	Col Legno (or mit Holz)
At the Point of the Bow	Punta d'Arco	(de la) Pointe	Spitze
At the Frog	al Tallone	du Talon	am Frosch
Bells in the Air	Campane in Aria	Pavillons en l'Air	Schalltrichter auf
Half (a string group)	la metà	la moitié	die Hälfte
Stopped (horns)	Chiuso (Chiusi)	Bouché(s)	Gestopft
Brassy		Cuivré	Schmetternd
Open	Aperto (Aperti)	Ouvert(s)	Offen
With Soft Stick	Bacchetta di Spugna	Baguette d'Éponge (Baguette molle)	mit Schwammschlegel
With Hard Sticks	Bacchette di Legno	Baguettes en Bois	mit Holzschlegeln
Change C to E	Sol Muta in Mi	Changez Do en Mi	C nach E Umstimmen
Change to Piccolo	Muta in Piccolo	Changez en Piccolo	Piccolo Nehmen
Near the Sounding Board (harp)		Près de la Table	
Desk or Stand	Leggio	Pupitre	Pult
In the Ordinary Way (after *sul pont.*, *sul tasto*, etc.)	Modo Ordinario	Mode Ordinaire	Gewöhnlich
String	Corda	Corde	Saite

Appendix B: Bibliography

1. ORCHESTRATION

Anderson, A. O. *Practical Orchestration*. Boston-New York: C. C. Birchard, 1924.

† Bennett, R. R., *Instrumentally Speaking*. Melville, New York: Belwin-Mills, 1975.

Berlioz, H. *Treatise on Instrumentation*. Enl. and rev. by R. Strauss. Transl. by Theodore Front. New York: E. F. Kalmus, 1948.

+ Blatter, A. *Instrumentation / Orchestration*. New York: Macmillan, 1980.

+ Casella, A. *La tecnica dell'orchestra contemporanae*. Milan: Ricordi, 1959.

Clappé, A. *The Principles of Wind-Band Transcription*. New York: Carl Fischer, 1921.

Erpf, H. *Lehrbuch der Instrumentation* Mainz: B. Schott's Söhne, 1959.

Forsyth, C. *Orchestration*. London: MacMillan, 1942.

Gevaert, F. A. *Nouveau traité d'instrumentation*. Paris: Lemaine, 1885.

———. *Cours méthodique d'orchestration*. Paris: Lemaine, 1890.

Humperdindinck, E. *Instrumentationslehre*. Köln: Verlag der Arbeitsgemeinschaft für rheinische Musikgeschichte, 1981.

Isaac, M. *Practical Orchestration* [for Schools]. New York: Robbins Music, 1963.

Jacob, G. *The Elements of Orchestration*. Westport: Greenwood Press, 1976.

Jacob, G. *Orchestral Technique*; London: Oxford University Press, 1931.

Kennan, K. W. *The Technique of Orchestration*. 3rd ed. Englewood Cliffs: Prentice-Hall, 1983.

Kling, H. *The Art of Instrumentation*. New York: Carl Fischer, 1905.

Koechlin, C. L. E. *Traité de l'orchestration*. 4 Vol. Paris: Max Eschig, 1954–1959.

Kohs, E. B. *An Aural Approach to Orchestration* published and available from the author.

Kunitz, H. *Die Instrumentation.* 13 Vol. Leipzig: Breitkopf und Härtel, 1956–1961.

Lang, P. *Scoring for Band.* New York: Mills, 1950.

Leibowitz, R., and J. Maguire. *Thinking for Orchestra.* New York: Schirmer Books, 1960.

McKay, G. F. *Creative Orchestration.* Boston: Allyn and Bacon, 1963.

Piston, W. *Orchestration.* New York: W. W. Norton, 1955.

Prout, E. *Instrumentation and Orchestration.* 2 Vol. Boston: Ditson, 1877.

Read, G. *Thesaurus of Orchestral Devices.* New York: Pitman, 1953.

Rimski-Korsakov, N. *Principles of Orchestration.* Transl. by Edward Agate. New York: Dover, 1953.

Rogers, Bernard. *The Art of Orchestration.* New York: Appleton-Century-Croft, 1951.

Teuchert, H. and E. R. Haupt *Musik-Instrumentenkunde in Wort und Bild.* Leipzig: Breitkopf und Härtel, 1924.

Wagner, J. F. *Orchestration.* New York: McGraw-Hill, 1959.

Wagner, J. F. *Band-Scoring.* New York: McGraw-Hill, 1960.

Wellesz, E. *Die Neue Instrumentation.* Berlin: Max Hesse Handbücher, 1928.

Widor, C. M. *The Technique of the Modern Orchestra.* London: J. Williams, 1906.

Wright, D. *Scoring for Brass Band.* Colne, Lancastershire: J. Duckworth, 1935.

2. THE HISTORY OF THE ORCHESTRA AND ORCHESTRAL INSTRUMENTS

Baines, A. *Musical Instruments Through the Ages.* Baltimore: Penguin Books, 1961.

———. *Woodwind Instruments and Their History.* London: Faber, 1967.

Barnes, W. H. *The Contemporary American Organ.* New York: J. Fischer, 1952.

Becker, H. *History of Instrumentation.* Cologne: Arno Verlag, 1964.

Bekker, P. *The Orchestra.* New York: W. W. Norton, 1963.

Bellow, A. *The Illustrated History of the Guitar.* New York: Colombo, 1970.

Belt, P. et al. *The Piano*. New York: W. W. Norton, 1988.

Bevan, C. *The Tuba Family*. New York: Charles Scriber's Sons, 1978.

Blades, J. *Percussion Instruments and Their History*. London: Faber, 1975.

Brymer, J. *The Clarinet*. New York: Schirmer Books, 1976.

Carse, A. *History of Orchestration*. New York: Dover Publications, 1964.

———. *Musical Wind Instruments*. New York: Da Capo Press, 1966.

Coerne, L. A. *The Evolution of Modern Orchestration*. New York: Macmillan, 1908.

Geiringer, K. *Musical Instruments*. New York: Oxford University Press, 1945.

Goosens, L., and E. Roxburgh. *The Oboe*. New York: Schirmer Books, 1977.

Gregory, R. *The Horn*. New York: Praeger, 1969.

———. *The Trombone*. New York: Praeger, 1973.

Kentner, L. *Piano*. New York: Schirmer Books, 1976.

Korn, R. *Orchestral Accents*. New York: Farrar, Strauss, and Cudahy, 1956.

Kroll, O. *The Clarinet*. Trans. Hilda Morris. New York: Toplinger, 1968.

Langwill, L. G. *The Bassoon and the Contrabassoon*. New York: W. W. Norton, 1975.

Leipps E. *The Violin*. Trans. H. W. Parry. Toronto: Toronto University Press, 1969.

Menuhin, Y., Wm. Primrose, and D. Stevens. *Violin and Viola*. New York: Schirmer Books, 1976.

Niland, A. *Introduction to the Organ*. London: Faber and Faber, 1968.

Owen, B. and P. Williams *The Organ*. New York: W. W. Norton, 1988.

Reusch, R. *The Harp*. New York: Praeger, 1969.

Sadie, S. ed. *The New Grove Dictionary of Musical Instruments*. New York: Grove's Dictionaries of Music, Inc., 1984.

Tumbull, H. *The Guitar from the Renaissance to the Present Day*. New York: C. Scribner's Sons, 1974.

Wheeler, T. *The Guitar Book*. New York: Harper and Row, 1974.

3. INDIVIDUAL INSTRUMENTAL TECHNIQUE

a. Strings

Bachman, A. *An Encyclopedia of the Violin*. Trans. F. H. Martens. New York: Da Capo Press, 1976.

Galamian, I. *Principles of Violin Playing and Teaching*. Englewood Cliffs, New Jersey: Prentice-Hall, 1962.

Green, E. A. H. *Orchestral Bowings and Routines.* Ann Arbor, Michigan: Ann Arbor Publications, 1957.

Potter, L. *The Art of Cello Playing.* Evanston, Illinois: Summy Birchard, 1964.

Turetzky, B. *The Contemporary Contrabass.* Berkeley: University of California Pres, 1974.

b. Woodwinds

Bartolozzi, B. *New Sounds for Woodwinds.* London: Oxford University Press, 1967.

Biggers, C. A. *The Contrabassoon: A Guide to Performance.* Bryn Mawr, Pennsylvania: Elkan Vogel, 1977.

Cooper, L. H., and H. Toplancky. *Essentials of Bassoon Technique.* Union, New Jersey: Toplansky, 1968.

Dick, R. *The Other Flute.* New York: Oxford University Press, 1975.

Dorn, K. *Saxophone Techniques (Multiphonics), Vol I.* Islington, Massachusetts: Dorn Publications, 1975.

Howell, T. S. *The Avant-Garde Flute.* Berkeley: University of California Press, 1974.

Pellerite, J. *A Modern Guide to Fingering for the Flute.* Bloomington, Indiana: Zalo Publishers, 1972.

Putnik, E. *The Art of Flute Playing.* Evanston, Illinois: Summy Birchard, 1970.

Rascher, S. M. *Top-Tones for the Saxophone.* Boston: Carl Fischer, 1941.

Rehfeld, Ph. *New Directions for the Clarinet.* Berkeley: University of California Press, 1978.

Spenser, W. G. *The Art of Bassoon Playing.* Evanston, Illinois: Summy Birchard, 1958.

Sprenkle, R., and D. Ledet. *The Art of Oboe Playing.* Evanston, Illinois: Summy Birchard, 1961.

Stein, K. *The Art of Clarinet Playing.* Evanston, Illinois: Summy Birchard, 1958.

Teal, L. *The Art of Saxophone Playing.* Evanston, Illinois: Summy Birchard, 1963.

Tose, G. *Aristic Clarinet Technique and Study.* Hollywood: Highland Music, 1962.

Weisberg, A. *The Art of Woodwind Playing.* New York: Schirmer Books, 1975.

c. Brass

Farkas, P. *The Art of French Horn Playing.* Evanston, Illinois: Summy Brichard, 1956.

Franz, O. *Complete Method for the Horn.* New York: Carl Fischer, 1906.

Kleinhammer, E. *The Art of Trombone Playing.* Evanston, Illinois: Summy Birchard, 1963.

Schuller, G. *Horn Technique.* London: Oxford University Press, 1962.

d. Percussion and Others

Blades, J. *Orchestral Percussion Technique.* New York: Oxford University Press, 1973.

Davis, R. *The Organists' Manual.* New York: W. W. Norton, 1985.

Peinkofer, K., and F. Tannigel. *Handbook of Percussion Instruments.* Trans. K. and E. Stone. Mainz: B. Schott's Söhne, 1976.

Reed, H. D. and J. T. Leach. *Scoring for Percussion.* Englewood Cliffs, New Jersey: Prentice-Hall, 1969.

Salzedo, C. *Modern Study for the Harp.* New York: G. Schirmer, 1948.

Smith-Brindle, R. *Contemporary Percussion.* New York: Oxford University Press, 1970.

Stahl, Wm. C. *Stahl's New Mandolin Method.* Milwaukee: J. Flanner, 1900.

4. ELECTRONIC MUSIC AND INSTRUMENTS

a. Books

Anderson, C. *MIDI for Musicians.* New York: AMSCO Press, 1986.

Dodge, C. and T. A. Jerge *Computer Music: Synthesis, Composition and Performance.* New York: Schirmer Books, 1985.

Massey, H. *The Complete DX7II.* New York: AMSCO Publications, 1987.

Roads, C. and J. Strawn, eds. *Foundations of Computer Music.* Cambridge, Mass: The MIT Press, 1985.

b. Journals

Computer Music Journal, The MIT Press, Cambridge, Mass.

Electronic Musician, Mix Publications, Berkeley, Cal.

Keyboard, GPT Publications, Cupertino, Cal.

Copland, *Appalachian Spring* © Copyright 1945 by Aaron Copland; Copyright renewed; Reprinted by permission of Aaron Copland, Copyright owner and Boosey and Hawkes, Inc., Sole Licensees—pp. 160, 254, 436–38

Copland, *Billy the Kid* © Copyright 1946 by Aaron Copland; Copyright renewed; Reprinted by permission of Aaron Copland, Copyright owner and Boosey and Hawkes, Inc., Sole Publishers—p. 403

Copland, *Music for the Theatre* © Copyright 1932 by Cos Cob Press; Copyright renewed; Reprinted by permission of Aaron Copland, Copyright owner and Boosey and Hawkes, Inc., Sole Publishers—p. 166

Copland, *Outdoor Overture* © Copyright 1948 by Hawkes and Son (London) Ltd.; Copyright renewed; Reprinted by permission of Aaron Copland, Copyright owner and Boosey and Hawkes, Inc., Sole Publishers—p. 303

Copland, *Symphony No. 3* © Copyright 1947 by Aaron Copland; Copyright renewed; Reprinted by permission of Aaron Copland, Copyright owner and Boosey and Hawkes, Inc., Sole Licensees—p. 63

Holst, *The Planets* © Copyright 1921 Goodwin and Tabb Ltd. Boosey and Hawkes Ltd., London. Printed by arrangement. Reprinted by permission of Boosey and Hawkes, Inc.—pp. 180, 493

Moussorgsky/Ravel, *Pictures at an Exhibition* © Copyright 1929 by Edition Russe de Musique; Copyright renewed; Copyright and renewal assigned to Boosey and Hawkes, Inc.—pp. 323, 338, 517–18

Prokofiev, *Lieutenant Kije Suite* © Copyright 1936 by Edition A. Gutheil. Copyright assigned to Boosey & Hawkes, Inc. Reprinted by permission—p. 178

Respighi, *Fountains of Rome* © Copyright 1925 by G. Ricordi & Co.; Copyright Renewed. Reprinted by permission of Hendon Music, Inc., a Boosey & Hawkes Company, Sole Agents—p. 322

Strauss, *Ariadne Auf Naxos* © 1912, 1913, 1916, 1922, 1924 by Adolph, Furstner and Furstner Ltd.; Copyright renewed; Copyright and renewal assigned to Boosey and Hawkes Ltd.—p. 415

Strauss, *Capriccio* © Copyright 1942 by Richard Strauss; Copyright renewed; Reprinted by permission of Boosey and Hawkes, Inc., Sole Agents—p. 204

Strauss, *Der Rosenkavalier* © Copyright 1909, 1911, 1912 by Adolph Furstner; Copyright renewed; Copyright and renewal assigned to Boosey and Hawkes, Inc.—pp. 293, 412

Strauss, *Salome* © Copyright 1905 by Adolph Furstner; Copyright renewed; Copyright and renewal assigned to Boosey and Hawkes, Inc.—pp. 175, 192, 202, 295

Stravinsky, *J.S. Bach Choral Variations* © Copyright 1956 by Boosey & Hawkes, Inc.; Copyright Renewed. Reprinted by permission—pp. 336, 355

Stravinsky, *Movements for Piano and Orchestra* © Copyright 1960 by Hawkes and Son (London) Ltd.—p. 608

Stravinsky, *Orpheus* © Copyright 1948 by Boosey and Hawkes, Inc.; Copyright renewed—p. 28

Stravinsky, *Petrouchka* © Copyright by Edition Russe de Musique; Copyright assigned to Boosey and Hawkes, Inc.; Copyright 1947; Revised version; Revised edition, Copyright 1948; Copyright renewed—pp. 310, 409

Stravinsky, *Pulcinella* © Copyright 1924 by Edition Russe de Musique; Renewed 1952; Revised version; Copyright 1949 by Boosey and Hawkes, Inc.; Copyright renewed—p. 93

Stravinsky, *Le Sacre Du Printemps (Rite of Spring)* © Copyright 1921 by Edition Russe de Musique; Copyright assigned 1947 to Boosey and Hawkes for all countries of the world; Copyright renewed—pp. 45, 64, 76, 163, 202, 212, 259–61, 307, 452

Stravinsky, *Threni* © Copyright 1959 by Boosey and Company Ltd.—p. 311

Stravinsky, *Symphony of Psalms* © Copyright 1931 by Edition Russe de Musique; Renewed 1958; Copyright and renewal assigned to Boosey and Hawkes, Inc.; Revised edition copyright 1948 by Boosey and Hawkes, Inc.; Copyright renewed—p. 249

The above titles have been reprinted by permission of Boosey and Hawkes, Inc.

Alexander Broude, Inc.

Dahl, *Sinfonietta* © Tetra Music Corporation. Sole Selling Agent: ABI/Alexander Broude, Inc., 225 West 57th Street, New York, New York, 10019–p. 203

Chester Music

Stravinsky, *Les Noces* © 1922 by J&W Chester Ltd. Used by kind permission of J&W Chester/Edition Wilhelm Hansen; London Limited—p. 426

Deshon Music, Inc.

Penderecki, *Threnody to the Victims of Hiroshima* © 1961 by Deshon Music, Inc. and PWM Editions; All rights reserved. Printed in the U.S.A.—pp. 140–41

Durand S.A.

Debussy, *Jeux* © 1914 Durand S.A.; Used by permission of the Publisher; Theodore Presser Company, Sole Representative U.S.A.—p. 274

Debussy, *La Mer* © 1938 Durand S.A. Used by permission of the publisher; Theodore Presser Company, Sole Representative U.S.A.—pp. 34, 35, 247–48, 275, 478

Ravel, *Boléro* © 1929 Durand S.A. Editions Musicales 1981; Editions ARIMA and Durand S.A. Editions Musicales, Joint Publication; Used by permission of the Publisher; Theodore Presser Company; Sole Representative U.S.A.—pp. 207–8

Ravel, *Daphnis et Chloé* © 1913 Durand S.A. Editions Musicales; Editions ARIMA and Durand S.A. Editions Musicales, Joint Publication; Theodore Presser Company; Sole Representative U.S.A.—pp. 101, 174

Ravel, *Ma Mère l'Oye* © 1911 Durand S.A. Editions Musicales; Editions ARIMA and Durand S.A. Editions Musicales, Joint Publication; Theodore Presser Company; Sole Representative U.S.A.—pp. 216, 513, 531–36

Ravel, *La Valse* © 1921 Durand S.A. Editions Musicales; Editions ARIMA and Durand S.A. Editions Musicales, Joint Publication; Theodore Presser Company; Sole Representative U.S.A.—pp. 18, 216, 322

European American Music

Berg, *Lyric Suite* © 1927 by Universal Edition; Copyright renewed; All Rights Reserved; Used by permission of European American Music Distributors Corporation, sole U.S. and Canadian agent for Universal Edition—p. 67

Berg, *Violin Concerto* © 1936 by Universal Edition; Copyright renewed; All Rights Reserved; Used by permission of European American Music Distributors Corporation, sole U.S. and Canadian agent for Universal Edition—p. 318

Berio, *Circles* © 1972 by Universal Edition (London) Ltd., London; Used by permission of European American Music Distributors Corporation, sole U.S. agent for Universal Edition—p. 428

Hindemith, *Kleine Sonate* © B. Schott's Soehne, Mainz, 1929; © renewed 1957; Used by permission of European American Music Distributors Corporation, sole U.S. agent for B. Schott's Soehne—p. 79

Hindemith, *Mathis der Maler* © B. Schott's Soehne, Mainz, 1934; © renewed; All Rights Reserved; Used by permission of European American Music Distributors Corporation, sole U.S. and Canadian agent for B. Schott's Soehne—pp. 33, 124

Hindemith, *Nobilissima Visione* © B. Schott's Soehne, Mainz, 1940; © renewed; All Rights Reserved; Used by permission of European American Music Distributors Corporation, sole U.S. and Canadian agent for B. Schott's Soehne—p. 333

Hindemith, *Der Schwanendreher*, © B. Schott's Soehne, Mainz, 1936; © renewed; All Rights Reserved; Used by permission of European American Music Distributors Corporation, sole U.S. and Canadian agent for B. Schott's Soehne—p. 71

Hindemith, *Sonata, Op. 11, No. 4* © B. Schott's Soehne, Mainz, 1921; © renewed by Schott & Co., Ltd., London 1949; Used by permission of European American Music Distributors Corporation, sole U.S. agent for Schott & Co., Ltd.—p. 71

Hindemith, *Symphonic Metamorphoses*, © Associated Music Publishers Inc., New York, 1945; © Assigned to B. Schott's Soehne, 1946; © renewed; All Rights Reserved; Used by permission of European American Music Distributors Corporation, sole U.S. and Canadian agent for B. Schott's Soehne—p. 355–57

Kodàly, *Háry János* © 1927 by Universal Edition; © assigned 1952 to Universal Edition (London) Ltd., London; © renewed; Used by permission of European American Music Distributors Corporation, sole U.S. and Canadian agent for Universal Edition, London—pp. 185, 402

Kodàly, *Psalmus Hungaricus* © 1926 by Universal Edition; © renewed; All Rights Reserved; Used by permission of European American Music Distributors Corporation, sole U.S. and Canadian agent for Universal Edition—p. 197

Orff, *Carmina Burana* © B. Schott's Soehne, Mainz, 1937; © renewed; All Rights Reserved; Used by permission of European American Music Distributors Corporation, sole U.S. and Canadian agent for B. Schott's Soehne—pp. 425, 602

Penderecki, *Dies Irae*, "Apocalypsis," mm. 2–4; © 1967 by Moeck Verlag, All Rights Reserved; Used by permission of European American Music Distributors Corporation, sole U.S. and Canadian agent for Moeck Verlag—p. 263

Schuller, *Seven Studies on Themes of Paul Klee*, "Arab Village" © 1962 by Universal Edition-London; All Rights Reserved; Used by permission of European American Music Distributors Corporation, sole U.S. and Canadian agent for Universal Edition London—p. 262

Webern, *Six Pieces for Orchestra*, *Op. 6* © Copyright 1961 by Universal Edition, A. G., Wien; All Rights Reserved; Used by permission of European American Music Distributors Corporation, sole U.S. and Canadian agent for Universal Edition Vienna—p. 64

Webern, *Symphonie*, *Op. 21* © Copyright 1929 Universal Edition; Copyright renewed; All Rights Reserved; Used by permission of European American Music Distributors Corporation, sole U.S. and Canadian agent for Universal Edition—pp. 506–7

MCA Music

Druckman, *Windows* © 1973 by MCA Music, a Division of MCA Inc., New York, N.Y. Used by permission. All rights reserved—p. 366–67

Milhaud, *Suite Française* © 1945, 1946, 1947 by MCA Music, A Division of MCA Inc., New York, N.Y. Used by permission. All rights reserved—pp. 545–48

Merion Music, Inc.

Schuman, *New England Triptych* © 1957 Merion Music, Inc.; Used by permission of the Publisher—p. 244

Oxford University Press

Vaughan Williams, *Symphony No. 6* © 1948 Oxford University Press—p. 280

Walton, *Belshazzar's Feast* © Copyright 1931 by the Oxford University Press, London—p. 590

C.F. Peters Corporation

Bassett, *Variations* © 1966 by C.F. Peters Corporation; Used by permission—p. 454

Benson, *Symphony for Drums and Wind Orchestra* © 1963 by Henmar Press, Inc.; Used by permission of C.F. Peters Corporation—pp. 445–47

Schoenberg, *Five Pieces for Orchestra* © 1952 by Henmar Press, Inc.; Used by permission of C.F. Peters Corporation—pp. 361–62, 498–99

Theodore Presser

Stravinsky, *Tango* © 1941 Mercury Music Corp. Used by permission of the publisher—p. 105

G. Schirmer, Inc.

Barber, *Essay for Orchestra* © 1942, 1945 by G. Schirmer, Inc.; Used by permission—p. 87

Barber, *Symphony No. 1* © 1943 by G. Schirmer; Used by permission—p. 293

Bernstein, *Fancy Free* © 1950, 1968 by Warner Bros. Inc. (renewed) All rights reserved. Used by permission.—pp. 455, 456

Bernstein, *On the Town* © 1945, 1968 by Warner Bros. Inc. (renewed) All rights reserved. Used by permission.—p. 410

Bloch, *Schelomo* © 1918, 1945 by G. Schirmer; Used by permission—pp. 394, 494–96

Diamond, *Fourth Symphony* © 1949 by G. Schirmer; Used by permission—p. 43

Harris, *Symphony No. 3* © 1939, 1949 by G. Schirmer, Inc.; International Copyright secured; Used by permission—p. 84

Holst, *The Planets* © Copyright J. Curwen & Sons. International Copyright Secured. All rights reserved. Used by permission—pp. 180, 493

Milhaud, *La Création du monde* © Editions Max Eschig. Used by permission of Associated Music Publishers, Inc.; Sole U.S. Agent—p. 93

Piston, *The Incredible Flutist* © 1939 Arrow Music Press Inc.; Used by permission of G. Schirmer—p. 172–73

Powell, *Miniatures* © 1971 G. Schirmer; Used by permission—p. 414

Prokofiev, *Symphony No. 5* © 1971 G. Schirmer; Used by permission—p. 346

Ravel, *Pavane for a Dead Princess* © Editions Max Eschig. Used by permission of Associated Music Publishers, Inc., Sole U.S. Agent—p. 289

Schuller, *Concerto for Orchestra No. 2* © 1978 Associated Music Publishers, Inc.; Used by permission of G. Schirmer—p. 205

Sessions, *Symphony No. 2* © 1949 G. Schirmer: Used by permission—p. 318

Shostakovich, *Symphony No. 5* © 1937 Edition Musicus; Used by permission of G. Schirmer Inc., U.S. Agent—p. 451

Shostakovich, *Symphony No. 6* © 1946 Leeds Music Corporation; Used by permission of G. Schirmer, Inc., U.S. Agent—p. 425

Stravinsky, *L'histoire du Soldat* © Copyright 1987 Chester Music. International Copyright Secured. All rights reserved. Used by permission—p. 196

Warner Bros. Music

Gershwin, *Concerto in F* © 1927 New World Music Corporation; Copyright Renewed. All Rights Reserved. Used by permission of Warner Bros. Music—p. 364

Gershwin, *Rhapsody in Blue* © 1924 WB Music Corp.; Copyright Renewed. All Rights Reserved. Used by permission—pp. 107, 166, 304, 363

Index

Books That Live In Music

THE NORTON MANUAL OF MUSIC NOTATION *By George Heussenstamm*
THE MUSIC KIT SECOND EDITION *By Tom Manoff*
Regular and CAI versions
SCALES, INTERVALS, KEYS, TRIADS, RHYTHM, AND METER *By John Clough and Joyce Conley*
BASIC HARMONIC PROGRESSIONS *By John Clough and Joyce Conley*
A NEW APPROACH TO EAR TRAINING *By Leo Kraft*
A NEW APPROACH TO KEYBOARD HARMONY *By Allen Brings et al.*
A NEW APPROACH TO SIGHT SINGING THIRD EDITION
By Sol Berkowitz, Gabriel Frontrier, and Leo Kraft
SIGHT SINGING: PITCH, INTERVAL, RHYTHM *By Samuel Adler*
EAR TRAINING AND SIGHT SINGING *By Maurice Lieberman*
MOSTLY SHORT PIECES *Edited by Mark DeVoto*
THE NORTON SCORES FIFTH EDITION *Edited by Roger Kamien*
GRADUS SECOND EDITION *By Leo Kraft*
HARMONY FIFTH EDITION *By Walter Piston*
Revised and Expanded by Mark DeVoto
WORKBOOK FOR HARMONY FIFTH EDITION *By Arthur Jannery*
INTRODUCTION TO SCHENKERIAN ANALYSIS *By Allen Forte and Steven E. Gilbert*
ANALYTIC APPROACHES TO TWENTIETH-CENTURY MUSIC *By Joel Lester*
STRUCTURAL FUNCTIONS OF HARMONY REVISED *By Arnold Schoenberg*
TWENTIETH-CENTURY HARMONY *By Vincent Persichetti*
COUNTERPOINT *By Walter Piston*
THE STUDY OF COUNTERPOINT *By J. J. Fux (Ed. & Tr. by Alfred Mann)*
SONATA FORMS REVISED *By Charles Rosen*
ORCHESTRATION *By Walter Piston*
THE STUDY OF ORCHESTRATION SECOND EDITION *By Samuel Adler*
WORKBOOK FOR THE STUDY OF ORCHESTRATION SECOND EDITION *By Samuel Adler*
A GUIDE TO MUSICAL STYLES *By Douglas Moore*
A GUIDE TO MUSICAL ANALYSIS *By Nicholas Cook*
ANALYSIS *By Ian Bent*
MUSICAL FORM AND MUSICAL PERFORMANCE *By Edward T. Cone*
PERSPECTIVES ON MUSICAL AESTHETICS *Edited by John Rahn*
THE ACOUSTICAL FOUNDATIONS OF MUSIC REVISED *By John Backus*
THE NORTON/GROVE CONCISE ENCYCLOPEDIA OF MUSIC *Edited by Stanley Sadie*
THE PIANO *By Philip R. Belt et al.*
VIOLIN FAMILY *By David D. Boyden et al.*
THE ORGAN *By Barbara Owen and Peter Williams*
EARLY KEYBOARD INSTRUMENTS *By Edwin M. Ripin et al.*
THE ORCHESTRA *By Paul Bekker*
CHORAL CONDUCTING *By Abraham Kaplan*

W·W·NORTON

ISBN 0-393-95807-8
90000 >
EAN